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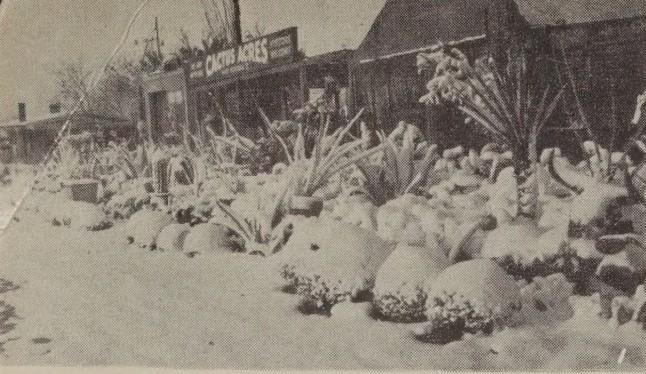
U. S. Department of Agriculture

Cactus Acres

El Paso  
Texas.



**THE STORY OF CACTUS**



This little book is intended to help the beginner in cactus lore. There is a widespread opinion that all spiny plants are cacti and that such plants grow only in deserts and on rocky hillsides. This is far from being the case; not only do many cacti have no spines, and many plants not cacti have spines, but many cacti grow in rich soil where rainfall is heavy.

The writer hopes to avoid using many botanical names as much as possible, also to avoid using common local names as such usage leads to confusion.

Step by step he hopes to lead the layman, thus:—

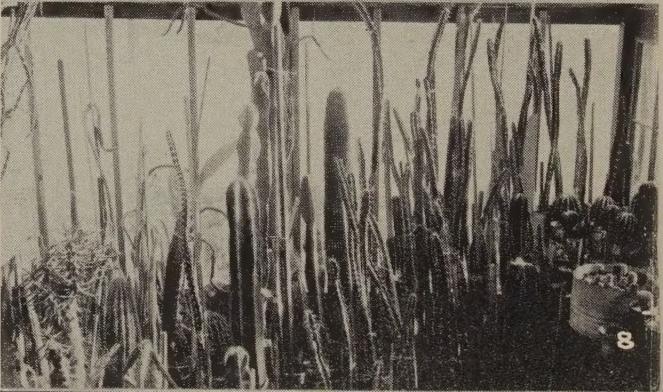
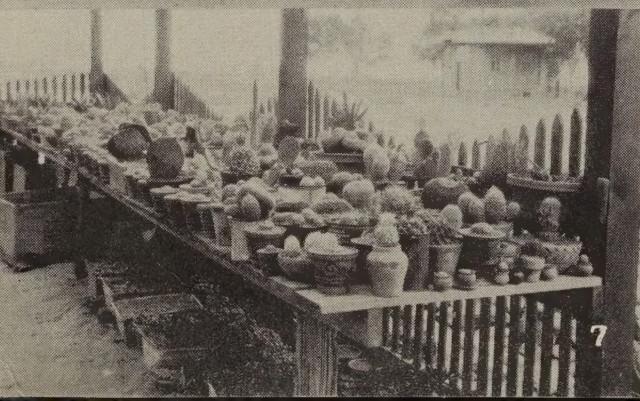
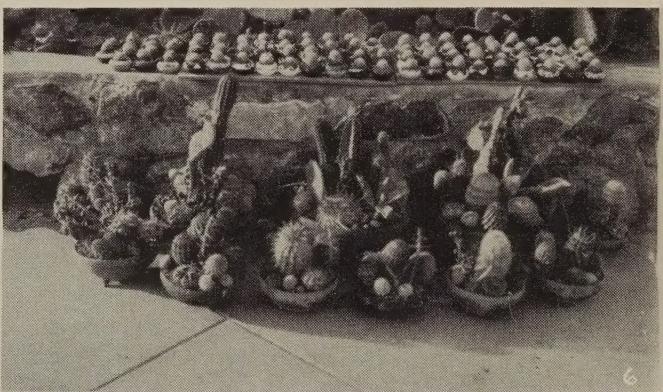
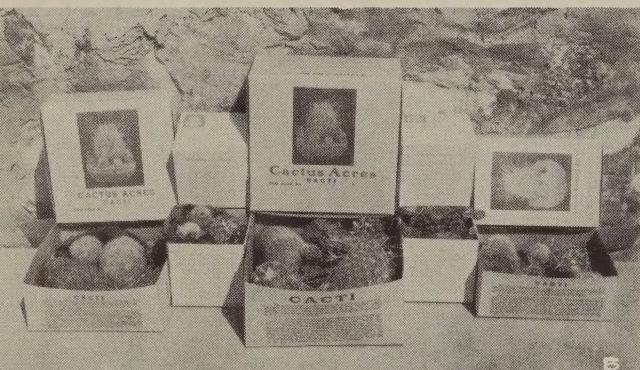
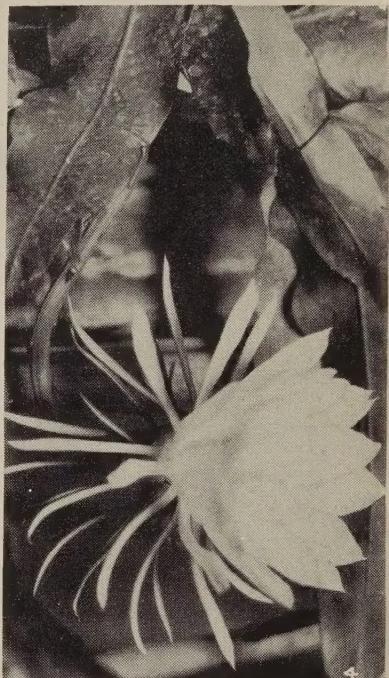
1. What is a cactus?
2. How did cacti get their name?
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(All following numbers refer to photographs)

We wish to thank those who have helped in the preparation of this little book and especially my wife, Clara (Lea) Leasure, for the food recipes and my daughter, Mary Elizabeth Leasure, for the pen-and-ink drawings and Mr. J. G. Gerlach for the photographs on both sides of the back cover and Dr. W. W. Waite for two of his photographs, and Mr. J. Edgar Hoover for the photograph of his desk. All other photographs by the writer.

This little book is dedicated to Mr. W. S. McMath who made it possible.

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## WHAT IS A CACTUS?

This little book is intended to answer the above questions for those who do not know and for those who wish to learn more about these odd plants. For twenty years we have had this question asked almost daily by the many tourists who have passed by our gardens.

Many other questions have been asked, some rather odd but none we thought foolish, as a cactus is an unique plant to many. Some of the questions would seem foolish to the initiated, however we are trying to answer a few of those most frequently asked. We shall be glad to answer any question one may care to ask but all inquiries must be accompanied by stamps.

To be a cactus a plant must have five distinct characteristics. First, it must be a perennial; second, have two seed leaves (cotyledons) (47); third, have areoles or spine cushions; fourth, have a single celled seed-pod or berry; fifth, have ovary of the flower below the insertion of the petals and sepals. If a plant has all these, it is a cactus, if it has not it is some other plant.

The areoles are organs of great importance. One may almost call them the hearts of the cactus plant, for in addition to feeding the plant the spines grow out here, new branches start here, leaves come out here, flowers start here, and new roots in a cutting or partition center in the areoles. Sometimes the roots come out just above or just below the areoles. If one cuts off all the areoles, the plant ceases to grow. The writer has a *Cereus pruinosa* that ordinarily will grow three feet in a year, which grew not at all, after having its areoles cut off nine years ago. If the spines are pulled from the plant and the areoles are undamaged, new spines will grow out again but this process sometimes takes a year or two.

The cactus is a succulent and is only one of the twenty or more succulent families, which number among their members the *Yucca* (112), *Stapelia*, *Agave* (100) *Aloe*, *Crassula*, and *Euphorbia*. Many species of the latter so resemble cacti plants that the beginner will mistake them for cacti.

## HOW DID CACTI GET THEIR NAMES?

Although cacti are indigenous to North and South America and the adjacent islands, they secured their name from a town of Greece named Kaktos, which means spiny plant. Kaktos was a small town which lay in the heart of the thistle belt; sailors from this town visiting the West Indies saw a plant covered with spines and perhaps they thought of their homeland fields of spiny thistles, and carried some back to show their friends.

Anyway, the plants first made their appearance in Kaktos and were first called "The Plants from Kaktos," This was shortened to "Kaktos Plants," and in English became "Cactus Plants."

Opus, Greece, grew the *Platypuntia* for its fruit so the "Prickly Pear" (96) got its name from this town and today the *Opuntia* grows wild in several countries of Europe, mainly Switzerland and Northern Italy, and several species grow wild in the countries bordering the Mediterranean Sea.

## HOW DID CACTI ORIGINATE?

At one time many thousands of years ago, all cacti were vines of bush-like trees similar to the lemon tree, and to this day many species retain their leaves. The plants can be traced through the ages from the *Pereskia* down to the *Carnegiea gigantea* (102) which grows fifty feet tall and to the *Peniocerus greggii* (43) which grows 95% underground. Climatic changes caused the evolution of these plants and caused them to discard their leaves or to change them into pads, as the *Platypuntia*. These climatic changes were due either to decreased rainfall or the seeds being carried to a semi-arid or arid region by the elements or by birds and animals.

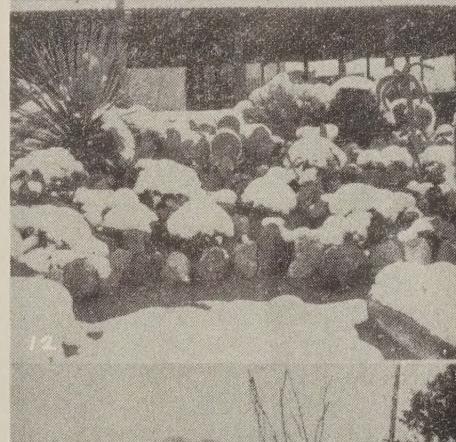
The *Pereskia* was followed by the *Pereskiopsis* (*Opuntia*) with a more pronounced trunk and branches, the spine cushions were larger and thicker. A new growth of spines (Glochids) appeared and the leaves were larger and thicker. These thickened leaves and trunk show a more arid living condition. From there on the leaves play a very small part in the evolution of the cacti, and the leaves of the opuntia are only awl-shaped appendages. The *Opuntia sublata* under certain conditions will retain all its leaves.



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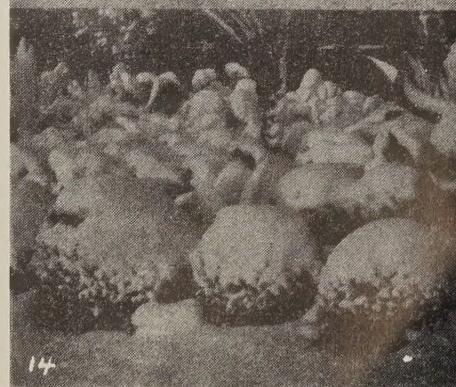
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9 *Ferocactus wislizeni* 200 pounds.  
10 Six inches of snow at Cactus Acres.  
11 A desert garden of 200 kinds.

12 Snow partly melted.  
13 Cactus garden properly mounded.  
14 Barrel Cactus in snow.

The third change in these curious plants found one division with all pads and the other all trunks and stems. The Napalea pads sometimes grow to twenty by thirty inches and the old pads at the ground look like the trunk of a tree.

We have seen the trunk of the *Opuntia fulgida* (20) over a foot thick and the plant over fifteen feet high in Arizona.

The *Opuntia braziliensis* has both pads and thickened trunk. It seems to be the link which proves the third change in the shape of these interesting plants.

The *Platyopuntia* or Pad Cactus changed with the climate. As the seeds were carried farther and farther north, the Pads grew smaller and smaller and the plants learned to drain their water in the winter. The *Opuntia opuntia* (17) do the same in Canada, shrivelling themselves up and living down close to the ground, but in the spring they will get full of water and stand erect again. The *Opuntia fragilis* in Colorado also stays dormant during the winter months. This is one of the smallest of the *Platyopuntia*, rarely getting over an inch per pad.

The *Cylindropuntia* (25) is the forerunner of the *Cereus*. as the climate became dryer and dryer, the *Cereus* got larger and larger until they changed into the present *Carnegiea gigantia* (19) with its huge trunk three feet thick and arms twenty to thirty feet long, or to the barrel shaped *Ferocactus wislizeni* 91 which grows ten feet tall and weighs half a ton. These can go five years without a rainfall.

### WHERE DO CACTI GROW ?

As we have said before cacti are indigenous to North and South America and the adjacent islands, there is one exception, a certain *Rhipsalis*, found in Ceylon but never found in the Americas. Cacti grow from below sea-level in Death Valley, California to an altitude of eighteen thousand feet in the Andes Mountains of South America. They grow from Terra del Fuego to Alaska and in areas where rain seldom or never falls, in the jungles of Panama where five inches of rain fell in two and one half minutes for a measured world's record. They also grow where it rains nearly every day in Brazil.

Cacti grow near Yuma, the hottest part of the United States and also in Minnesota where the temperature has registered fifty degrees below zero. This is a temperature range of nearly two hundred degrees. They grow in all kinds of soil. The *Ariocarpus fissuratus* (29) can be found growing on limestone ridges where there is absolutely nothing but lime dust between the rocks, we have gathered cacti in Panama where the soil is so rich that it takes one man working hard all day and every day to keep a trail three feet wide, cut only one mile through the jungle.

To sum this up, cacti grow in every degree of heat and cold, every degree of latitude where there is soil for a foothold every degree of altitude and in any kind of soil or any kind of weather.

We mentioned a certain *Rhipsalis* which grows in the East Indies as an epiphyte, clinging to the bark of trees like mistletoe. This little cactus grows like a bunch of small white candles, one-half inch long and one-sixteenth inch in diameter, one attached to another.

Of the 1500 species, over 500 species are native of Mexico and 176 species are known to grow in the United States and several species grow in Canada and one species in Alaska. Texas, due to its great size and length, has 98 species, Arizona 72, New Mexico 67, California 41, Oklahoma 18. These figures are derived at by adding the species recognized by Britton & Rose, *Cactaceae*; Texas Cacti by Quillin; California Cactus by E. M. Baxter, Wooten, *Cacti of New Mexico* and Dr. Houghton's Book on Cacti.

Also through conversation and correspondence with such men as Gates, Hester, Eller, Thornber, Rose, Radley, (21) Bradbury, Fletcher, Potter, Teggleberg, Benedict, Poindexter, Gibson, Whitehead (22) and others, we believe that the above totals are short, as we have some twelve species which we have not been able to identify all from Arizona, New Mexico, and Texas. Cacti have been reported found growing in every state of the United States except Rhode

15 Cacti growing on rocky hillside.

16 Cactus Garden Boyce Thompson Arbor.

17 *Opuntia opuntia* near Fostoria Ohio.

18 Giant Crest near Tucson, Arizona.

19 Giant Forest in Arizona.

20 Collecting *Opuntia fulgida* pods.

Island and they grow from 250 feet below sea level to a height of 14000 feet in California alone, and in Peru grow over 4000 feet higher. The writer has seen cacti growing in Death Valley where a rain comes once every few years, and also in Panama where it rains at least every day for nine long months.

### TYPES OF CACTI

As in all plants, the binomial system is used in naming. All cacti are under one family Cactaceae which is divided into three tribes Pereskiae, Opuntiae, and Cereeae which are again divided into about one hundred twenty-five genera. Each genus is divided into species except the monotypic genus or that genus which has only one species. The Toumeya papyracantha is a good example of this. Each of the fifteen hundred species are again divided as to varieties or forms. A variety of a species is where the plant has changed due to something in the soil or the altitude or climate as the Opuntia opuntia has brown glochids in Ohio (17), Indiana, and Missouri but in Maryland and Virginia, they are reddish, and in Tennessee the pads are much larger than in Ohio. These observations are from wild plants collected by the writer.

A form may be regular (64), monstrose (22) or crested (16), one does not recognize a malformation which is caused from growing plants too long inside; a platyopuntia kept in a dark room will grow about the size of a lead pencil and a yard long. Also the plant will be white instead of its rich green color. The nipples on the corypantha will grow out of shape and the plant lose all the pigment in its skin; this will give it an entirely different appearance.

A monstrose form will grow very irregularly, usually having bumps or knots all over it. They always grow true to form but a crystate will grow in a pattern usually spread like a fan and ruffled. These are both caused by the doubling and redoubling of the artery system of the plant and not from an injury to the plant as some state. The proof of this statement is that the seeds of a crystate will germinate about eighty percent crystates. If a plant is injured nature will immediately start searing the injury over with a hard woody shell, which seals the torn arteries. When an artery is injured, it stops right there as in the case of a plant with the top cut off, a new head will start from an areole. To explain this better, let us liken the cactus plants to a city water system. In the city the water is pumped and stored, and then used at some future time. That is just what the cactus does, when it rains the roots suck up the water and the arteries carry the water to cells which store the water in the plant. If a pipe is broken in the city, a new pipe can be run around the break and the water flows on. This is what the cactus does. The system of arteries in a cactus all start in the roots and end at each areole so when a new head breaks out, a complete set of pipes is ready to carry the water to all parts of the new head. But when these arteries start to double and re-double, the plant loses its regular shape and may take on any of a hundred shapes, no two crystates are identical. We have only used the words arteries and pipes to make this more easily understood.

As there are about fifteen hundred species of cacti, one might say there are fifteen hundred forms as no two are exactly alike. They range in size from the colossal Carnegiea gigantea of Arizona that grows to a height of fifty feet, down to the Corypantha minima (80) that scarcely ever grows to be an inch high. These diminutive plants were discovered by us in company with Mr. A. H. Hughes, who is postmaster at Station A, El Paso, Texas, in the Spring of 1927, on a collecting trip in the Big Bend of Texas. We sat on a ledge to eat our lunch when imagine our surprise to see a row of little pink blooms in a crevice of rock one-quarter inch wide. When we investigated, we found small plants with the heaviest spines in proportion of any plant in existence.

Some cacti grow in the shape of a tree (76), some in the form of a ball (81), some like a vine (57), and others in every conceivable shape. One of the queerest is the Peniocereus greggii which grows about ninety-five percent under ground. The plant in Arizona has been known to grow a root system of one hundred twenty-five pounds when the stock and branches weight less than five pounds. Then there are the Epiphyllum (4) which grow as leaves, mostly many times longer than they are wide, and the Rhipsalis which grows

21 Radley cutting A. pentagonus.

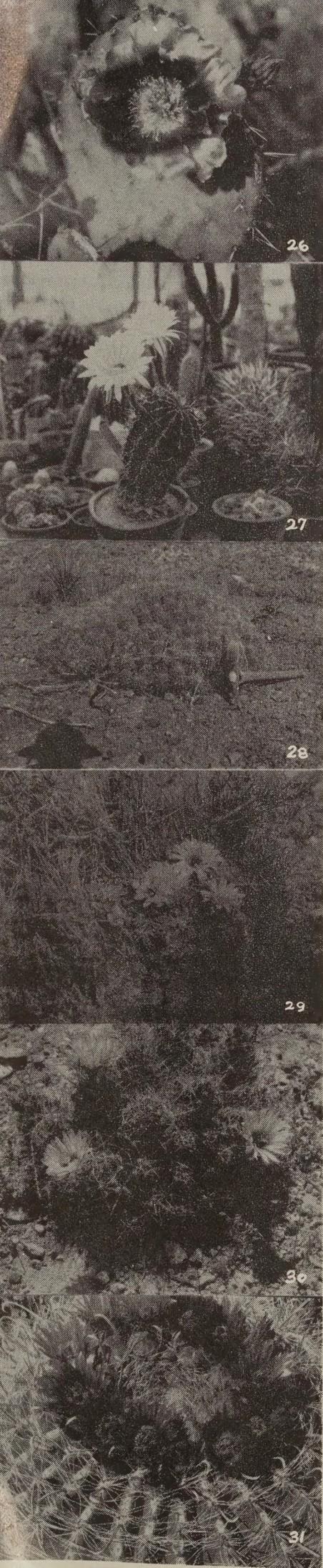
22 Whitehead and a fine monstrous.

23 Blooming-size cacti, on the hand.

24 Echinopsis meuhleri in bloom.

25 Opuntia arborescens





one leaf after another in a regular chain; as it gets older the chains branch and hang down. The best example of this is; the old favorite, the Christmas Cactus, *Zygocactus truncatus*.

### PARTS OF A CACTUS PLANT

A cactus plant has numerous organs and each has a distinct function, and may be likened to the human body in a great many ways. The woody axis may be likened to our skeleton, as its function is to hold up the plant, the pulpy cellular tissue is not unlike our flesh and contains the cells that store up the non-evaporating mucilaginous substance on which the plant lives through the long periods of drought.

The cuticle which surround this mass is similar to the skin which covers our body and has as many functions if not more. It will grow back in exactly the same way, first forming a scab tissue and eventually changes to skin but in some cases, it is hard and woody, also very unsightly.

The stomata are the pores of the plant and have nearly the same uses as our pores. Sometimes the flowers grow out from a line close to the areoles, this line we believe is a continuation of the areoles as they are always connected.

The areoles also grow the leaves and contain the stomata but these latter are sometimes placed in the same way as the flowers. When a pad is placed on soil, new roots will grow out of the areoles on the underside and new shoots will grow out of the areoles on the upper side, and when a plant is cut in two or the head is crushed, a new stem or branch will grow out of the uppermost areoles. This proves that the roots are directly connected with the areoles by veins or pipes which carry the life-blood to the new part. This brings up the vascular system which may be likened to the veins of the human body. The Pereskia and the Pereskiopsis retain their leaves because they live in a tropical climate and the Opuntia sublata retains its leaves with plenty of water and care, otherwise, they drop off.

### SPINES AND THEIR USE

The spines could be called the clothes of the cactus, as they are the protection. Without spines, cacti would soon disappear as the wild animals would eat them in very short order.

The spines are of two distinct and different kinds and each has a function to perform. The centrals are usually much longer and always stronger. They stand out from the plant and are the plants defense. Some are curved and others are straight, some have hooks and others have sheaths which come off very easily and stay in anything that touches that particular spine.

The other spines are called laterals, they usually stand out in a lateral circle from the areoles and keep certain insects away from the plant. They also are a camouflage as they sometime take on the coloring of the surrounding ground or foliage. They are sometimes plumose and at other times lasio or lasi but in every case their use is the same.

Although most plants have both centrals and laterals, a few have only one kind or the other. A good example of a cactus with only laterals is the *Echinocereus rigidissimus* (106) and a very good example of a cactus without laterals is the rare *Thelocactus rinconensis*.

The spines are of every conceivable shape and size, from the ten inch spines of the Ferocactus down to the minute spines of the *Neomammillaria denudata* (85). The feathery spines of the *plumosa* are in no way comparable to the heavy stiff spines of the *Homalocephala texensis*, which can easily enter a horse's hoof. This has earned for this cactus the sobriquet of Manco Caballo, Devil's Head. The spines of the *Ferocactus wislizeni* (31) are hooked and so strong that one spine can support fifty pounds without breaking.

Spines have been used by primitive man in all his pursuits, hunting, fishing, sewing clothes, and in one case reported by Dr. Safford, they were used in closing shrouds by interlapping them in the cloth and winding the ends with cord made of gut. The Indians used the hooked spines of the *Ferocactus wislizeni* for fishhooks by using short pieces of spines for barbs. These, they reversed and tied on the tip with a gut treated with a waterproofing compound of some sort so the gut would not become soft in the water and stretch,

26 Prickly Pear in Flower.

27 Echinopsis tubiflora in bloom.

28 Echinocereus stramineus.

29 Ariocarpus fissuratus in bloom.

30 Mammillaria macromeris.

31 Ferocactus wislizeni in bloom.

allowing the barbs to slip off. They also made combs of spines and in a few cases ornaments, by weaving them into small species of deerskin.

It is the spines which clothe the cactus in its bright colors all the way from the white spines of the *Cephalocereus senilis* to the black spines of the *Echinocereus fendleri* (86) (centrals) which stand out like a large black darning-needle. What could be more beautiful than an *Echinocactus grusonii* about the size of a large tub with its bright golden spines, or the red and yellow rings of *Echinocereus rigidissimus* (106).

### CACTUS CULTURE

Cactus culture is not hard but there are a few ironclad rules one must follow. First, find out what country the cactus comes from, then about how much water it takes. If the country is in the tropics, one will know the cactus will freeze in a cold climate. It must be protected from cold. If it comes from a country where the rainfall is excessive, one can very well know that the soil will be rich and waxy because rain makes plants grow and the faster a plant grows, the quicker it dies and goes back into the soil as humus. If the plant comes from a dry country, one can figure it grows in sand and needs a supply of lime. By this, one can see it is very important when preparing soil to make it either heavy, light, sandy or with lime, to meet the needs of each individual cactus, and it is a good idea to put a little lime or broken mortar in each batch of soil.

When we mix soil for our cacti, we take half heavy soil and half clean sand and when we are in doubt as to the purity of the soil, we heat it on a pan over a hot fire. Then we add about a quart of crushed old mortar to a bushel of this mixture. This will do for nearly all cacti. If it is heat treated, one must fertilize again as the humus is burnt out. We suggest one secure some cow-lot manure that is over one year old. If one uses commercial fertilizer, he should be careful not to use too much. Using the above soil the plants which come from a wet climate will take more water. NEVER USE OLD SOIL OVER AGAIN. Some recommend peat moss. We do not use it for any but tropicals and then very sparingly as it has a tendency to hold water and one knows water will give a plant root-rot. We do recommend a little charcoal to sweeten the soil and some cacti will do well when a very little sulphur is sprinkled in but be very careful, using this in quantity is dangerous to most plants.

Transplanting plants is very important because here is where over half of one's troubles start. When a shipment of plants are received, place them submerged in lukewarm water for half an hour then dry them in the shade. Examine the roots of each plant carefully for bruises or disease. Cut these roots off and if the disease goes up into the plant, cut it all away. This seems severe but it is not. In fact, it is the only way to save the plant. Of course, if the plant is cut, it must be treated as a cutting before it is planted or it will rot. Do not plant the cactus too deeply. This will rot the plant also. Plant the roots straight down in the soil. They will spread of their own accord and if the plant falls over because the roots are too short, place sticks around the plant to hold it upright until the roots are strong enough to keep the plant in place. This may not look well but it is better than killing the plant by planting it too deep.

### GROWING CACTI FROM CUTTINGS

Growing cacti from cuttings is a very quick way to get new plants. First, have a very sharp knife so as not to tear the plant. When removing the cutting, try to cut it with one stroke and only in one direction. Then rub the cut part with air-slacked lime and place in a flat with the cut part up to the sun for about two weeks, this allows the cut part to sear over. The cutting may then be planted in builder's sand until it roots and then placed in the soil best suited to that particular plant. A cutting of *Acanthocereus pentagonus* (21) which had lain under a bench for seven weeks grew roots over six inches long in less than a month. We had a cutting of a *Cephalocereus senilis* that took over two years to root but some *Opuntias* will root in three days. We have never tried the chemical rooting compounds.

32 The writer planting an *Echinopsis*.

33 South American Cacti.

34 Sixtyfive *Echinopsis* blooms.

35 Greenhouse No. 5.

36 Mexican plants under lathhouse.





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Another way to root cuttings is to "layer them", that is, to lay them on their side on good soil. This way the roots will come out of the bottom areoles and new shoots will come out. We had a *Trichocereus spachianus* which broke off about eighteen inches from the top. This top we laid on a pile of sand and when we next saw it, the end had started to turn up. We left it there and in the first season, it grew over two feet. Early the next year, we cut out a one-inch section, just back of this new growth, leaving the old part on the ground. Imagine our surprise to find a lot of shoots coming out from under the cutting. We then tried covering the entire cutting with sand but it rotted. So the best way is to lay it in a groove but do not let the soil cover it. We had covered pads of the *Opuntia tenuispina* just to get the queer shaped pads which would come up out of the sand. Some would be short and flat but most of them would be spatulate and some even would be curled, but all the subsequent pads which grew from these would be regular.

The most important treatment of a cactus is in the watering and when in doubt as to a cactus needing water, the answer is DON'T WATER. One can watch a plant and tell when it needs water. If a plant has adequate drainage, it can be watered more often than otherwise. In the spring, the plant will show new spines in the center of the top, then it can be watered liberally. Never pour water over a plant with a depressed top and never, never, water the plants in bright sunshine as the water drops form burning glasses which will make spots on the plant where insects will find entrance, and be also a disease hotbed. When cold weather (10) comes, it is time to start tapering off the water so as to prevent freezing. We sometimes use a little manure water on a backward plant. To make this, take an old vinegar barrel and partly fill with old rotted cow or sheep manure, fill with water and let it soak for a few days. Drain off this water and give some to each plant but not too much ( $\frac{1}{2}$  bushel to a barrel.)

### HOW TO GROW CACTI FROM SEED

Growing cacti from seed is a very interesting pastime and we believe will soon become the chief supply of these plants. One must first get fresh seed and then prepare seed pans or pots. The pots must be sterile so it is a good plan to boil before using. First, wash your seed in full strength semesan. This will keep the seedlings from damping off.

We use seed flats of about ten inches deep so any flower-pot ten inches or more is good. Fill this half full of fine crushed rocks, then prepare a mixture of peat moss and fine river sand about equal parts, the peat must be screened very fine and be thoroughly mixed with the sand. Fill the pot to within one inch of the top and press it firmly over the whole surface. Spray this surface with semesan lightly and then sprinkle the seeds over the whole surface. Sprinkle some sand over this but do not use enough to altogether cover the seeds. Then place this pot into a bucket half filled with water, until the water soaks up and wets the sand surrounding the seeds. Have the water lukewarm and then place the pot in bright light but not in direct sun. Place a piece of glass over the top of the pot and in a few days your plant will show as two little leaves on a stem. When we have very rare seeds, we sometimes mark off the pot with a stick and place the seeds with a pair of tweezers in a straight line and if we want to plant two kinds of seeds in one pot, we cut a piece of glass and divide the pot into two divisions by burying the glass in the sand. Be sure that you have some system for naming the seedlings. A numbered stick in each kind and the name of the cactus in your note book is good.

Water every other day until all the seeds germinate but always water from the bottom or you will wash out the seedlings. Never allow the sand to get dry. After the cacti begin to show spines and the cotyledons have dried off, it is time to transplant. (47) This should be done with care. Always dig up some soil with the little plant and have a hole ready in another flat or pot. This soil should be just a little richer than the last soil.

We have heard several queer ideas about germination. The latest came from

37 *Echinocereus conoides* in bloom.

38 *Echinocereus polycanthus* in bloom.

39 *Echinocereus dasycanthus* blooms.

40 *Echinocereus roetteri*.

41 *Echinocereus ennaecanthus* in bloom.

42 *Echinocactus horizonthalonius*.

an official of the Indian Service, who said one of the Arizona Dept. of Agriculture men told him that the seed of the Giant Cactus of Arizona had to pass through the digestive tract of a bird before it would grow. This is nonsense, seeds will grow and we believe more quickly after passing thru an animal or bird but only because the droppings fertilize it and soften the hard outer shell. We have a flat seedlings that grew from seeds collected by Papago Indians this summer.

### CARE OF CACTI IN COLD WEATHER

How to treat cacti in a cold weather has been a problem but is no more, as all one has to do is place the cacti in a cold-cellars during freezing months. We have seen two cacti collections in cellars, one in Sandusky, Ohio, and the other in Cleveland, Ohio. The collection in Sandusky is comprised of 285 species, and they were on benches, tubs, boxes and a wall that ran around the entire cellar. The lady who owned them said she lighted a lantern only when the temperature got below 35 degrees and that only happened a couple times last winter. The one in Cleveland owned by Mrs. Mach of Shaker Heights was in the cellar where she stored her vegetables. This cellar had a small window which was always kept open and she told me it never got colder than 40 degrees down there. We know of one cactus, an Arizona Giant, which has a wooden and glass house built over it each winter and an electric heating device installed, thermostat and all.

During December, 1936, in Kansas City, Mo. the thermometer dropped to ten degrees below zero for fifteen straight days and one cactus garden survived outside with the loss of only four small cacti where the snow blew in under the covering. First, a tarpaulin was stretched over the bed on stakes, one corner was left up a little to allow air to circulate so they would not mold. Then a foot of straw was placed over this and on top of all a large piece of oilcloth stretched over the straw and tied down all around but the vent. This collection had a four foot giant and a three foot candy barrel in it and we believe if the oilcloth had been larger, the four small cacti which died would have survived.

Some build greenhouses (32) and others just build an addition outside a window and allow the heat of the house to go out thru the open window; the neatest of these was in Pennsylvania where the house had an uncovered porch with french doors leading out. It was a simple matter to build a small greenhouse there which held over two hundred species. Now if building this kind of a window or balcony greenhouse, don't let gas fumes (Ethylene Gas  $C_2H_4$ ) get into it as gas kills the plants and if heating with gas, be sure the stove is inside an airtight box with an air vent from the outside to below the flame and a chimney to carry off the fumes. The air vent is necessary as the gas will not burn without air. Always have a pan of water on the stove for humidity.

### THE CACTUS GARDEN

In considering a cactus garden, (62) first pick out the sunniest place you have and then think about the drainage which is very important. It should be built about a foot above the surrounding grounds (51) and have at least a foot of drainage of broken rocks or cinders (51) below that. The soil should be half sand and half heavy soil with a liberal amount of lime mixed in. A bushel of charcoal will help keep it sweet and also tend to keep some diseases away. Always mound the soil having the center highest. (52) If making a bed eight feet in diameter, have the center two feet higher than the edge which is a foot higher than the surrounding ground. As to the wall, (63) this can be made from most anything. We use rocks which we get from the mines. These come in all colors and can be tied together with dabs of cement which in turn can be sprinkled with powdered stone to hide the cement.

In planting the cacti, always plant the largest specimen in the center (112) and so on down to the edge where the small ones can be placed between rocks to show them off. We also place rocks all among the cacti to keep the cacti upright. (62) In a cold climate, one can plant the cacti in pots and then plant the pots in the soil and place rocks around each pot to hide them. We

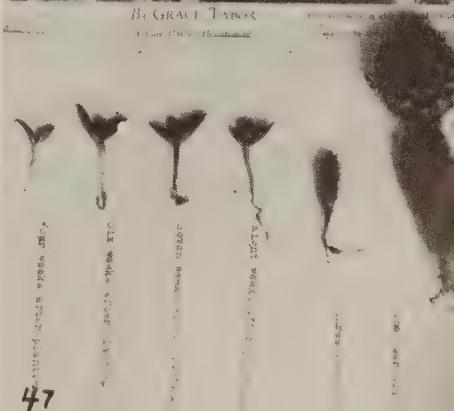
43 *Peniocereus greggii* in bloom.

44 Cactus garden and Agaves.

45 Bloom of a *Harrisia bonplandii*.

46 *Echinocereus dasycanthus*.

47 Seedlings.



have seen gardens where the pots were buried out of sight and it would take a sharp eye to notice the cacti were not planted in the soil itself. This has the advantage that the pots can be taken up in the winter placed in a cellar and the plants in no way disturbed.

With a few cacti which take shade to do their best, such as *Neomammillaria hemisphaerica* in shade, it would be advisable to have a large *Opuntia arborescens* (25) to plant them under or what is better, a *Yucca* (112) and as this is not a cactus, planting this would change your garden from a cactus garden to a desert garden. With a few cacti which take a lot of water, it would be advisable to plant them all to one end of the garden where they could have as much water as they need and not endanger the rest of the plants, as water which would make an *Acanthocereus pentagonus* (21) thrive, would kill an *Echinocactus horizonthalonius* (42) in a very few weeks.

Placing rocks between the cacti after the bed is finished, will keep the soil from washing away and hold the moisture where the roots can get to it, also give it a natural appearance. Colored rocks and weather-beaten rocks add a beauty nothing else will.

### PLANTING CACTI IN BOWLS

Planting cacti in bowls (6) is an art and one can make a cactus bowl a thing of beauty or an eyesore, according to the way the cacti are chosen and placed in the bowl. The cacti should be of different sizes, shapes and colors. If a round bowl is chosen, (54) a tall species should be placed in the center and the others placed around according to size. The smallest at the outer edge. This in an oblong bowl (105) would spoil the looks as the tall ones should be at one end and work down to the other where the small bottom cacti will fill in nicely. The hardest are the tall and the square bowls. A tall bowl planted with squat cacti will show up the bowl but not the cacti. So a good rule to follow is the taller the bowl, the taller the cacti. A square bowl will take fewer cacti. One can plant tall species in the back and small ones in front, or a tall one in one corner and work to the other three corners but any way you plant a square bowl, some of the effect is lost.

We have never approved of mixing cacti and other succulents in the same bowl but they go well together and make a pleasing dish-garden. Agaves, Aloes, Echeverias, Gasterias, and *Sempervivum* give a touch that no cactus alone can, but this must be called a succulent garden. Small figures of houses, animals and people add a certain charm and a old tray can be built up into a miniature garden (61) by using a few rocks, a handful of sand and a few small cacti. One of the finest we ever saw was made on a large platter, a toy hill was built of dirt, a shell walk led down to a looking glass pond where little pottery swans begged for food. A small clay dog lay on the front porch and horses and cows in the corral seemed to be so much at home that one almost expected them to knock down the fence and walk over the little cactus gardens scattered about. This garden well merited the blue ribbon it received at an Eastern Flower Show.

### DISEASES AND WHAT TO DO

The Australian Commission gathered over five hundred different insects from Cacti in Texas and over three hundred of these were known to live on the plant or the juices of the flowers or fruit, so if there is an insect on your cactus kill it. It may be having dinner or what is worse, laying its eggs inside the plant and when they are hatched, the plant is lost unless the larva are killed by either gassing them or pouring quicksilver into the hole. We have been told this will bring them out in a hurry but have had no experience with it.

The *Asphondylia opuntiae* or seed-midge is a minute maggot which bores into the seedpods and will usually cause them to drop off in a few weeks or else cause the seedpods to sprout and quite a number of small plant-like shoots will develop.

The most harmful bug is the stink bug or squash bug as it is usually called. This is a black bug about one-half to three-quarters inch long and smells badly when crushed. It is called *Coreidae anasatristis*. This bug usually sucks the juices from the plants but has been known to eat the young opuntias to the

48 Cactus garden at Radford School.  
49 Fort Worth, Texas cactus garden.  
50 Mrs. Williams and her cactus garden.

51 Cacti and rocks.  
52 In the writers cactus garden.  
53 Planting a Yucca in Hilltop Gardens.

ground and will eat a new opuntia pad until the edges are all serrated. Others, such as the Hemipterae and Pentatomidae (calicoback) suck the juices to such an extent that the plant will wither and die unless they are given a good dinner of "Blackleaf 40" or any other good nicotine preparation.

The yellow Mimorista worms (65) bore into the center of the plant and work down to the root and then the plant dies. When this worm gets into a plant, one never notices it until the plant dies and then it is too late. The only noticeable change in the plant is it loses its green waxy appearance but we do not advise one to cut open every one of their cacti that have this paleness as this may be caused by at least a dozen reasons.

The deep blue Melitarias do great damage to the Cylindropuntiae, especially the *Opuntia arborescens* (25) and in some parts of West Texas and New Mexico, nine out of ten plants are affected with the black-puff-ball like masses of secretion, showing this worm is at work. This worm is easy to control if caught in time. Just cut off the branch so affected before the worm has a chance to get to the heart of the plant. If one sees the secretion on the first branch the plant can easily be saved. We once had a blue plant found in Arizona, which had not been classified and it showed the work of a Melitarias. We cut it back and did not cut back far enough. We cut again and had to cut the third time. This time we cut the plant close to the ground, a shoot came up out of the ground and we now have a nicer plant than we had before. Always burn these affected parts and cut back enough the first time. The best way is to examine the cut part left on the plant with a powerful magnifying glass to see if the worm has gone on. A thorough spraying with Bordeaux Mixture in 2-2-50 mixture or Commercial concentrated lime-sulphur with Arsenate of Lead will discourage the worms.

If the plants are attacked by mealy-bug (*Pseudococcus citri* or *P. longifilis*) a good strong spray of water will wash them off. Then wash the plant with whale-oil soap and a weak solution of carbolic acid using a soft brush this will remove them easily.

Nematode Root-gall (*Heterodera radicicola*) is a disease that attacks the roots and they knot and contort and the swellings when cut open, will show a red line inside. This is a true worm and the roots should be cut back and the soil be removed and either burned or taken far away. There are two treatments for soil which cannot be removed. One is sterilization by steam and the other by formalin.

Red Spider (67) (*Tetranychus bimaculatus*) is just a nuisance and that is about all but they will suck some kinds of *Neomammillarias* until they turn grey and die. They will spin a web over the plants and are easily removed by a strong spray of water. Dusting with dry sulphur will kill them. Spraying with Volck will also kill them.

Aphides are ant cows and can be controlled with a kerosene emulsion and nicotine solutions, or tobacco dust or snuff dusted on them.

Cactus cottony cushion scale is insects which hide in cotton-like cocoons on the ends of spines. These are best controlled by a solution of four ounces of pyrethrum (Buhach) dissolved in one gill of alcohol and added to twelve gallons of water. Spray every two weeks until they are killed. Volck will also kill them.

Cutworms (*Agrotis*), arsenicals mixed with shorts and placed about the plants to poison or half inch holes punched near the plants to trap them.

Shot hole (68) (*Gloesporium lunatum*) appears in little black spots on the platyopuntias (66) which spread over the pad, turning grey with time. Then the pad dries up entirely and drops off. The best way to treat this disease is to cut off the infected pads as soon as they appear and burn them.

Cochineal (*Dactylopis coccus*) can best be controlled with a very strong needle spray of water with all the force one can give it. The male of the species looks like a small fly and the female encloses herself in a ball of cotton and looks like a fat spider but is really a louse. When on the plant, she looks like a small bunch of cotton growing on the plant and was at one time an important item of commerce. Six million pounds sold one year for \$4,200,000.

54 A well planted bowl of cacti.

55 Bloom of *Opuntia lindheimeri*.

56 *Harrisia tortuosa* in bloom.

57 *Echinocereus chloranthus* in bloom.

58 A bowl of cacti.





Root-rot is caused by too much wet heat at the roots of the plant. The quickest way this can happen is to have a cut in the cactus below the surface of the soil. The planting of cuttings fresh from the mother plant will rot in nine times out of ten. Another quick way is too much water. If the soil is kept wet for any length of time, the water will cause a soft spot to form at the roots. This will spread and in a few days, the plant will die. "An ounce of prevention is worth a pound of cure," so do not plant fresh cuttings and do not water the plants too much or too often. If you get root-rot cut off the affected part of the plant above the rot. Be sure no rot part is left as it will continue to spread after the plant is unplanted. Lime sprinkled on the cut part of the plant will help the cut to heal. Semasan will also help. Powdered charcoal and flowers of sulphur will act instead of lime but not so quickly. If the roots are affected, cut them all off close to the plant. This type of root-rot is not to be confused with *Phymatotrichum omnivorum* or *Ozonium* Root-rot which kills cotton. It has been known to kill certain species of cacti but for the most part it does not attack the plants and in very few cases can it be inoculated into any but a few opuntias. Phyma means a skin tumor and that is just what Ozonium Root-rot is and it is caused by a fungi, one of the family Mycelia sterilia. There is very little one can do for it except amputate as it kills in a very few days and one has very little chance to save a plant unless they see it before the rot has started into the plant proper. Burn all affected parts.

### WHEN TO FERTILIZE

Although cacti will get along pretty well without fertilizer, it will do better with a little, but one has to use great care in feeding these plants. Never give too much commercial fertilizer as it will burn the plants. The best is from a cow-lot and should be at least a year old. If no aged fertilizer is obtainable, a good plan is to use manure water. Dr. L. H. Bailey in "The Farm & Garden Rule-Book" gives the formula, one bushel cow manure to 100 gallons of water. Allow this to soak a couple weeks and then drain off the top water. This will not damage the most tender cacti if not too much is given the plant. We have used Vigoro on some of our plants and had very good success but don't put it too close to the roots.

### MAKING NEW SPECIES

One of the finest pastimes we know of is hybridization or making a new species. This must not be confused with pollinization as most cacti are self pollinating. That is, they all have a female element called stigma and male elements called pollen and as soon as the pollen enters the ovule, it is carried down to the ovary where conception takes place and the ovule quickly becomes a seed which is a little flower lying dormant only waiting for spring, soil, and a warm rain to break into two cotyledons, which is a baby cactus. In hybridization, all the above must take place but with the male element of one plant and the female of another kind of plant. When the flower is partly formed, take a pair of fingernail scissors, cut an opening through the sepals and petals, disclosing the interior without touching the filaments or style. Now take a fine hooked wire and pull out all the filaments and remove all anthers, making sure you do not leave any pollen behind. Then place a bag over the flower large enough for the flower to open. (We use cellophane so we can see the flower.) When the stigma is moist, take a few filaments from another species of cactus and sprinkle the pollen from these on the style, then tie up the flower again and number it, keeping all data as to names of parent stock, date of pollinization, etc. If the style is dry for any cause, take a drop of honey and a like amount of water and mix these. A little placed on the style will encourage fusion. The seeds will produce plants that are different from both the parent plants in either size, flowers, spines, shape or color. When one finds a cactus which has a tendency to produce larger flowers when crossed with another, it is advisable to use this plant with as many others as possible.

Mendel proved that all characteristics in a plant were caused by a combination of genes which are inherent (in equal amounts) from the parent plant (in each seed). Now a cactus that has genes that cause it to grow tall, the

59 *Coryphantha neo-Mexicana* and *C. echinus*.

60 Planted one inch pots.

61 The writer plants a dish garden.

62 A Dallas, Texas garden.

63 The writer's garden.

64 Ten year old Saguaros.

seed from that plant will grow like the mother plant in every case, and a cactus that produces red flowers will have seeds that grow cacti with red flowers. Now to change these characteristics, one must change the amount of genes in a seed. As the seed will not grow if cut open, one must change or rather kill some of these genes in the seed without disturbing the shell of the seed. These genes are so small that the only way to kill part of them is to use X-Ray and we are experimenting along this line with Dr. J. W. Cathcart, the X-Ray expert. We took five pods from a *Harrisia tortousa*. Each one we bombarded with the X-Ray a different length of time and are now awaiting results. This will take several years. We will give these results in another pamphlet.

### NAMING CACTI

Just a word on naming cacti. We believe that all cacti should be named after some characteristic of the plant or after some person who has distinguished themselves in botany or horticulture and not after every Tom, Dick or Harry. We know of several plants that are being called by names that should be in no way associated with these grand plants. Take the *Ferocactus robustus*, *ferocactus* or fierce-cactus, and *robustus*, robust. What better name could this fine plant be called? Suppose someone had a sister Sally and had named this plant *Ferocactus sallyii*. We discovered a fine little plant years ago and called it *Coryphantha minima* (70) because it never grew much over one-half inch high. We found this plant was named *Coryphantha neliae* later. A group of ladies had a cactus club meeting in a Western City and one of them brought a cactus which she had found in a Utah Desert. Not one of them could name it and no book they had in their club had it listed so they named it after their hostess. It was published because their description was such as no cactus expert could doubt it but as a new species. The first one who saw the plant that knew a *Utahia sileri* was nearly mobbed by the ladies when he told them just what it was. We believe a commission should be assembled in some way to go over all the names given to cacti in the last ten years and straighten out this mess.

We do not believe the above is as bad as calling a cactus Strawberry, Pineapple, or some such name. We know a dealer that has so many silly names for cacti that no one can order a cactus elsewhere after once reading his list. In Texas, it is against the law to ship a plant unless it is labelled with its correct botanical name if it is named at all. We have had over two hundred different species pointed out to us as Strawberry Cactus at one time or another.

### USES OF CACTI

There are many uses for cacti and the main one is of food for man and beast. About twenty-five years ago many thought that the spineless cacti (55) would revolutionize stock feeding in the West because in Southern California, a small part of the desert was irrigated and planted with spineless cacti. This patch grew a gigantic crop and the growers advertised this fact. This area had a long growing season and no frost and also the patches were fenced for rabbits. Many were taken in with the so-called possibilities of this plant for forage and many thousands of dollars were spent on spineless cactus pads. Mr. Chas. Newman of El Paso, Texas, bought five hundred dollars worth and planted the pads at Newman, New Mexico, and one season was all they lasted. The jackrabbits ate them. A Chicago man, an executive of a terminal warehouse, wrote me in 1931, that he wanted five hundred pads to plant on his Illinois farm and asked if we could get them for him at 50c a piece. We wrote him we could get them for him at 10c a piece but they would not live in Illinois three months unless they were in a greenhouse or other protection. The ad he had, priced them at one dollar each and told of the large yield but failed to tell that they would die if the ground was wet for twelve days, or that they would freeze at the first gentle frost.

The native cacti (72) of the Southwest are very different. They will stand zero weather and have so many thorns that it is almost impossible for an animal to eat them and also, they will live where the spineless will dry up and die. During times of drought, the stockmen burn off the spines with a torch. A

65 A Mimerista worm in an *Opuntia*.

66 Growing in solid rock.

67 Showing web of Red Spider.

68 Rabbit Cactus and *Echinopsis*.

69 *Harrisia bonplandii*.



little of this is good for animals at all times because of the purgative salts they contain and a New Mexico sheep-rancher always has burnt-off cacti around at lambing time because the ewes do not get enough exercise at this time and the loss of lambs are reduced.

The finest scale remover for boiler tubes is made out of the Giant Cactus of Arizona but this practice was stopped by the State, as all the cacti would have been cut down in just five years, and what a loss that would have been to the scenic beauty of that part of our country.

Fried cactus is quite palatable. As much so as egg plant and personally we like it. In the spring, the desert is covered by Mexicans with baskets and buckets gathering the small new pads for salad. They fry it, in butter or lard, and mix green peppers with it. We think it is too hot for our taste but when fixed with tomatoes it is quite good.

The seed pods (75) are the main source of food supply and in every market in Mexico, they are sold as food and are now being shipped to Northern markets. Jam, (101) jelly, and preserves are made from the seed pods, and the Indians have made wine from seed pods of the Opuntias for untold generations.

The fruits as we have said, are all good to eat and in each part of the country have different names. The fruit of the Prickley-pears is called Tunas, and most all the *Echinocereus* (28) species are called Pitayas. The small pepper-like berries are called Chilitos. These mostly are from the *Neomammillarias* and many of the berries are called garambulas, regardless of size, throughout Mexico. A ripe Tuna cooked into a pan of applesauce will give it a very fine pink color.

The Papago Indians of Arizona gather tons of the fruit of the giant cactus and remove the seeds and then press it into cakes and make it into jam. The seed they sell to traders to sell as bird-seed and we know one seedman who bought twelve hundred pounds in the fall of 1938.

We will let Mrs. (Clara) Leasure (101) tell you how she prepare the cacti for our table.

Cactus Jelly is made from the fruit of the cactus commonly called Prickly Pear. There are many varieties of the prickly pear but the one that produces the best fruits for jelly is named *Opuntia lindheimeri*. (75) The fruits on these plants, when ripe, are a deep rich purple and are about the size of an average hen's egg. To make the jelly, the tunas or pears are picked before they are fully ripened. To remove the skins and spines, the pears are scalded with boiling water and peeled. The pears are then cut into small pieces and boiled for twenty minutes. They are then poured into a bag and the juice drained. The juice is measured and an equal amount of sugar added. This is placed on the stove and cooked until it jells. It is then removed from the stove and poured into glasses. Sometimes apple or lemon juice is added, but many prefer the rich flavor of the cactus pears without adulteration. In making preserves, the same initial procedure is used but the seeds are removed before placing pears on the stove. Then the flesh of the pears are diced and the preserving is carried on as with other fruits. The seeds not having been cooked, may be dried in the sun for at least two weeks and then planted.

#### COLORING

The juice from the cactus pears may be boiled down to the consistency of syrup and bottled. This serves as a fine coloring for confections and icings. A few drops make a delicate pink while a spoonful will make a deep red, a range of shades may be obtained by adding more or less coloring. A pear in a pan of stewing applies will give a cherry red color and a tasty flavor. The cactus syrup also may color and flavor ice cream. This is called Tuna Meil.

#### CACTUS CANDY

Cactus candy is made from an entirely different variety of cactus. The barrel or fishhook cactus is used. The correct name for this variety of cactus is *Ferocactus wislizeni*. (31) The plants have to be large in size before they can be used for candy, because only the center is used. This is cut out of the heart

70 *Echinocereus rosei*.

71 *Echinocereus viridiflorus*.

72 *Opuntia tenuispina*.

73 *Echinocereus ctenoides*.

74 *Echinocereus fendleri*.

75 Gathering Tunas.

of the cactus plant and the rest is thrown away. This center pulp is then subjected to frequent boilings. It is then candied in sugar. The taste is non-descript and makes one think of candied citron or pineapple rather than candy. When one thinks that it takes from seventy-five to one hundred years to grow an adult cactus of this variety, one questions the use of such wonderful plants in cutting them up for candy.

#### FRUIT

The pears from the larger Opuntias may be chilled in the ice-box and eaten with great relish on a hot day, or if desired, they may be sliced and eaten with sugar and cream. I have been told that the Indians bake the pears but that is a way I have not tried as yet.

#### WINE

A delicious and non-intoxicating wine may be made from the fruit of the prickly pear. For this it is best to use the tunas from *Opuntia tenuispina* (72) as they make the best wine. They are smaller and juicier and of a rich reddish yellow color when ripe. The fruits gathered when dead ripe and placed in a pottery jar where it is allowed to remain overnight. It is then crushed and to each gallon of fruit is added five pounds of sugar and one gallon of water. The jar is covered with cheese cloth to keep out insects and the fruit is allowed to set until it ferments. It is then strained through a fine cloth to remove spines and pulp. The juice is allowed to stand until the wine thickens and sours to taste. It is then bottled and capped. The wine should be stored in a cool place. This makes a cooling summer drink and non-intoxicating believe it or not.

#### SALADS

To make salad, take the dead ripe pears of the *Opuntia lindheimeri*, (75) peel and remove seeds. Cut to resemble a water lily, fill with cottage cheese and place a small amount of salad dressing in the center. Chill and serve. This makes a delicious salad and you will admit an unusual one. A green salad may be made in the spring from the tender young shoots of the prickly pear.

#### FRIED CACTUS AND STEW

The fleshy projections that are to be found on the Opuntias in the Spring are about the size of a silver dollar. These may be gathered and washed, dipped in egg, rolled in bread or cracker crumbs and fried in deep fat. Or they may be diced and boiled with fresh pork and made into a stew. Onions and red peppers may be added if desired. It was reported to me that a woman rancher in a Western State insisted upon feeding her help so much cacti that the men rebelled and refused to remain unless a different menu was served. No doubt, the above would prove tiresome in large doses, but as an occasional divergence from the regular cut and dried bill of fare, cacti makes a wholesome and appetizing change. I have been told that some persons eat cacti as a correction for stomach ailments. But aside from the medicinal values of which I know nothing, I do know that cacti as a food is not harmful and that it is beneficial to the housewife who is trying to find something to pep up the jaded spring appetites of her family. So here's to cacti on your pantry shelves as well as in your gardens.

#### THE BEST CACTI FOR THE HOUSE

We have found only two classes of cacti that do well inside a house. The very wettest and the very dryest. The best are the species which take a heavy soil and considerable water. These cacti usually grow in the shade of other plants and trees so they easily adapt themselves to the semi-sunlight of a house. These can be watered about as much as a Geranium. The next best is the dry country cacti. These take little or no water and a sandy soil. These can go months and even years without water. The latter if given a good soaking once a month in the summer and no water in the winter will live a generation. These should be placed in the sunlight as much as possible and the soil should be dry to the bottom of the pot in the winter.

By the wettest, we mean species which grow in the lands of heavy rain-fall such as the *Zygocactus*, *Epiphyllum*, *Phyllocactus*, (4) *Harrisia*, (69) *Cereus*

76 *Opuntia arborescens*.

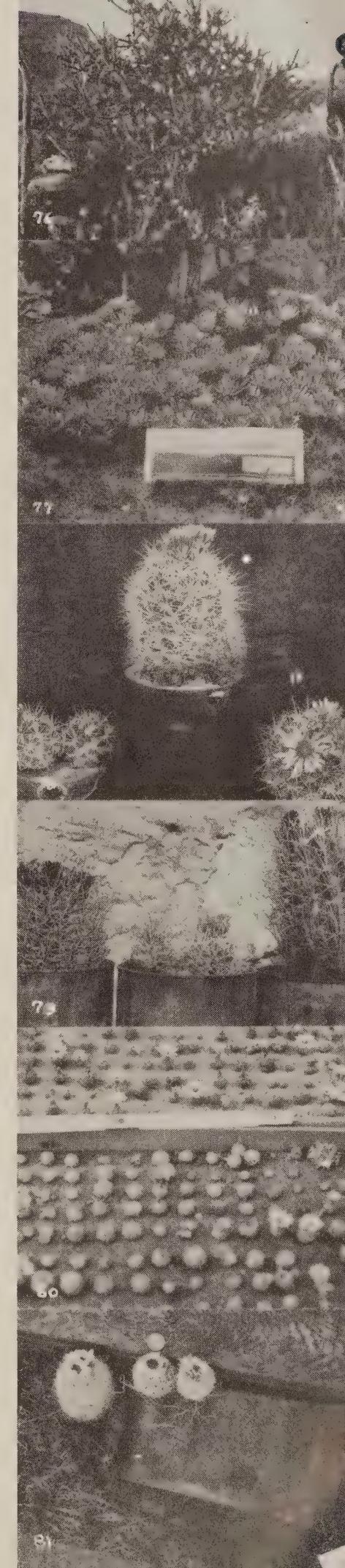
77 *Opuntia enneacantha*.

78 *Coryphantha muehlenpfordtii*.

79 *Ferocactus uncinatus* (Right).

80 *Coryphantha minima* (Nellie).

81 A new *Echinomastus*.



(57) and *Echinopsis*, (24) etc. These all bloom profusely indoors and for the most part are night-bloomers. Some of the above grow very large and will need a trellis to climb over in a couple years. All the above freeze easily except *Echinopsis*.

Taking everything into consideration, the best cacti for the house are the dry cacti, those which can go months and even years without water or care. By dry cacti, we mean those from countries with a minimum of rainfall, say six to ten inches a year. The dry cacti can stand quite a lot of freezing weather if they are not watered while it is cold.

The most beautiful of these are the *Echinocereus* and the *E. rigidissimus* (106) or Arizona Rainbow with its pretty red spines and rings. We think tops the lot. Its flower is purple-pink about three inches across.

The *E. dasycanthus* (73) or Texas Rainbow with its lemon-yellow flowers and red rings on a grey background is very striking and this plant will take quite a lot of abuse and one plant we mislaid was found five years later with still signs of life. It was accidentally filed away with old letters while moving in January, 1929, and in April 1934, while hunting an old letter, we found this plant with two small knobs growing out the side, as the box had been in a dark garage the new growth was white, both in spines and skin, but after a few days in the sun the skin turned green but the spines always stayed white.

The *E. viridiflorus* (71) or New Mexico Rainbow with its brightly colored spines and small green flowers will help brighten up any window sill. This plant is also known as the Green Flowered Pitaya.

Another plant which resembles this plant is the *E. chloranthus* (58). The main difference is in the flowers which are a rich brown and the spines are shorter and not so brightly tipped with red. When not in bloom very few can tell these two apart. Both have the common name New Mexico Rainbow.

Another fine variety is the *E. caespitosus*. This plant is sometimes called the Lace Cactus and well it may as the pretty brown spines are so placed on the spine cushions that they resemble a very fine lace pattern and the flowers of reddish purple sometimes are so profuse as to hide the plant entirely.

A plant that resembles this one so closely when not in bloom that we had them sent back as the same is the *E. fitchii* and the only real difference is the color of the bloom, and the spines on the *E. fitchii* stand out from the plant. The *Fitchii* blooms pink.

The *E. papillosus* grows in small clusters and makes a very desirable house plant because it always retains a dark green color and has many large yellow flowers with a deep red center.

*E. perbellus* with its short lacy spines and its large purple flowers looks like a little brother of the *E. richenbachii* whose flowers are about the size but more of a light purple or reddish pink color.

The next most desirable species are the *Coryphantha* (78) with their tubercles tufted on the end with showy spines and flowers quite large for the size of the plant. The *C. robustispina* (78 L.) with its large yellow flowers is one of the showiest and also one of the rarest. Large specimen plants eight inches high sell for ten to fifteen dollars and only a few clusters this size are found. As its name signifies, the spines are quite robust and also slightly hooked on the end of the main central spine.

One which is nearly identical with this plant is the *C. meuhlenphordtii* (78 R. of Texas. This plant is somewhat smaller and seldom grows cespitose and the spines are longer. Very seldom one with a central hooked spine appears. The flowers are lighter in color and reddish pink or light purple with a colored center quite darker than the ends of the petals. This is one of nature's finest cacti.

New Mexico finest *Coryphantha* is named after that State, *C. neo-Mexicana* (59 L.) and the blossoms which are prettiest in the evening, has earned it the name "Estria del tarde" or evening star. These blossoms range all the way from light pink to deep reddish pink.

*C. similis* with greenish brown flowers and *C. sucata* with lemon yellow flowers and *C. vivipara* with its pinkish flowers resemble each other to a great degree. They all grow in mounds from one to three feet across, as do

82 *Neomammillaria heyderi*.  
83 *Astrophytum ornatum*.  
84 *Echinocereus lloydii*.

35 *Neomammillaria denudata*.  
86 *Echinocereus fendleri* flower.

the *C. macromeris* (30) which has a purple flower which makes this last named plant look like a green pudding with purple plums sticking all over it when viewed from a short distance. Its spines are longer than the other three.

The *Thelocactus bicolor* has spines with two or three colors each and flowers are a very pretty rose pink with a red center. We have seen spines with red, brown and gray about equally divided along their entire length.

Here should be made mention of the two *Ancistrocactus* species which grow in Texas. They both make fine plants and both have spines tipped with hooks. *A. sheeri* with its yellow-green flowers and tuberous roots take a deep pot when planted other than in a bed. *A. brevianthus* with its rose colored flowers is slightly more globose and its spines more hooked and the roots quite fine.

The *Dolichothele sphaerica* with its large sulphur-yellow flowers, sometimes twice the size of the plant, will make a showing no other plant will and it spreads to a couple of feet in diameter over a period of years.

*Echinocactus horizonthalonius* (42) with its large pink flowers and bright green skin is a very desirable plant but should be given lime.

*Echinocactus setispinus*, also known as *Hematocactus setispinus*, has one of the prettiest flowers of any cactus. It is lemon yellow with a deep red center extending nearly half way up the petals and after the bloom dries up, the seed pods look like bright red peas for several months.

*Echinomastus intertextus* is a plant which is known as the Early Bloomer because it is the first cactus to bloom in the spring and has been known to shove its blooms through the snow sometimes as early as the last week in January. The bloom is small and white in color.

The *Ferocactus wislizeni* is known by a dozen names, such as Barrel Cactus, Fish-hook Cactus, Candy Cactus and others. This cactus is used to make most of the candy sold in the Southwest and many tales are told how desert travelers have cut the top out and got water to save their lives. We doubt these stories. This plant grows to a height of ten feet and weighs up to a ton. So there might be a little water in it somewhere. The flowers are yellow mostly but occasionally some are found with rose and red and yellow stripes.

The *Ferocactus uncinatus* commonly called Turks Head is one of the best with its long showy spines and its chocolate colored flowers and fruit almost hidden by the heavy cluster of hooked spines.

The *Neomammillaria heyderi* (82) with its small tubercles covered with spines or we should have said, tipped with a wheel of radial spines and a row of small flowers when it blooms, is a fine cactus for the indoor garden, especially when the seedpods are at their best. These have won it the moniker Strawberry Cactus. The flowers are pink and quite small. *N. hemisphaerica* with cream colored flowers, *N. applanata* with pink striped flowers and *N. meiacantha* with brown striped flowers are almost identical with *heyderi*.

One of the most peculiar cacti is the *Ariocarpus fissuratus* (29) or "Living Rock." It has no thorns and is sometimes called the "Star Cactus" as each year it grows five new tubercles in the shape of a star. The flowers are pink and the plant is very hard to find as it grows in almost pure limerock dust and the plant when covered with dust is almost impossible to see. This plant should be in every collection.

*Epithelantha micromeris* or button cactus is one of nature's gentlemen as it has spines so soft they will not stick the tenderest skin. The flowers are pink and so small that many times one does not see them but the seed pod sometimes sticks itself over half inch above the plant like a small red totem pole. Spines are white.

Another cactus which resembles this plant is the *Neomammillaria lasiacantha*. This little plant is globose instead of flat topped and the spines are hairy but one must have a very powerful microscope to see the hairs. The flowers are also pink but form a circle on the outer edge instead of appearing in the center of the plant.

The third plant in this group is the *Neomammillaria denudata*. (85) This plant has practically no spines with hair on and the flowers are larger, pinker, and have a brown stripe on each petal running lengthwise.



The most unusual cactus is the *Lophophoria williamsii* (87) or "Peyote" as the Indians call it. In Mexico, it is known as the "Mescal Button," also "wokowi." Certain Indian tribes call it "Kamaba" and others "Hikuli." The American frontiersmen called it "Dry Whiskey." This cactus contains a narcotic, anhalonium alkaloid lophophorine, which acts on the optic nerve making the user have beautiful hallucinations and all objects take on gorgeous hues. The flowers are pale pink. Known as Dumpling Cactus now and Sacred Mushroom by the first Spanish Padres it is quite famous.

We have a new species of *Ferocactus* which so resembles the *Ferocactus uncinatus* that the only difference, when not in bloom is that the spines are tipped a yellow color instead of the chocolate-brown. The flowers are yellow and the seed pods are yellow instead of chocolate-brown or reddish-brown. We call this plant *Ferocactus tabori* (79) in honor of Grace Tabor, for her untiring labor in the fields of floraculture. This plant has been found in twenty square miles of the Hueco Mountains of Texas. Only three specimens are known to exist in collections. (79) *Ferocactus uncinatus* right, *Ferocactus tabori* center, *Ferocactus hybrid* left.

Another new cactus is a *Thelocactus* which we will describe later as *Thelocactus butleri* in honor of Mr. Burridge Butler, publisher of the "Prairie Farmer" because of his work among the farmers of the Middle West.

Mrs Harry T. Johnson of Oklahoma City writes that the five finest Oklahoma species of *Echinocereus* are the following:

*E. albispinus*—The smallest of our *Echinocereus*. Most hardy and easiest to grow. Also the rarest. Likes partial shade and Oak leaf mold.

*E. purpurius*—Looks like *perbellis* but makes a much larger plant. Grows in gypsum soil and heavy red clay. Likes some shade. Is found in washes between mountains.

*E. baileyi* (*longispinus*)—Grows on granite mountain tops in decomposed ground. Full sun.

*E. oklahomeinsis*—Full sun. Lime stone gravel and leaf mold.

*E. richenbachii*—Full sun. Grows on lime stone mountans tops.

These plants are hardy at zero temperature if established in a well drained place.

The collection of cacti at Cactus Acres was started by a Mrs. Pierson at Laredo, Texas. In 1872 she made a trip into Mexico and fell in love with the Flora of that country and brought out several cacti for her garden and in the years that followed, she imported several thousand plants.

At her death, the plants were purchased and moved to El Paso, Texas by the late Mr. Herbert Potter, and just before his death the plants were sold to C. Leasure the present owner. Two of the original plants brought out of Mexico by Mrs. Pierson in 1872 are known to be alive and growing and several of the species have been preserved by means of cuttings and partitions.

There are at present slightly over a thousand varieties of exotic plants at Cactus Acres and they range in species from the *Astrophytum* (83) to the *Zygocactus*, and in size from the *Corypantha minima* of one-half inch in height to the *Carnegiea gigantea* which grows to a height of over fifty feet. Stop and visit us if out El Paso way.

If this little book has helped you, write us and if you think it should be enlarged, tell us why. Any suggestions you will send will be kindly appreciated or if you know of some fact about cacti which is not in this book, we would like to hear from you. If you have a friend who may be interested in this book, send us his address.

Sincerely,

JOHN HICKS LEASURE, El Paso, Texas

John Hicks Leasure

First Issue

See "Who Knows + What" Page 757

## DICTIONARY

- ABORTION**—Imperfect or non-development of an organ.
- ABSCSSION**—Falling off at a corky layer.
- ACANTHOCLADOUS**—Having spiny branches.
- ACANTHOPHOROUS**—Spine bearing.
- ACEROSE**—Needle shaped.
- ACICULAR**—Very fine needle shaped.
- ACUMINATE**—Tapering to a slender point.
- ACUTE**—Very sharp point or sharp angle.
- AERIAL ROOTS**—Roots formed on the stem.
- ALBISPINUS**—White spined.
- ALICOCHE**—Usually applied to the caespitose types of cacti, particularly *Echinocereus*, *blancii* and *pentalophus*.
- ANNULATE**—Distinctly marked with rings.
- ANTHERS**—The male part of the plant that contains the pollen.
- ANTRORSE**—Directed forward and upward.
- APICULATE**—Ending in a short pointed tip.
- APVRESSED**—Lying flat together for the entire length.
- ARBORESCENT**—Tree like.
- AREOLE**—Area of the growth center or organ of life.
- AREOLAE**—Plural of Areole.
- ASTERIAS**—Starlike-starry-stellate.
- ASTROPHYTUM**—Starlike plant.
- ATTENUATE**—Tapering or narrow.
- AXIL**—Angle formed by leaf and stem union.
- AZUREUS**—With sky blue color.
- BANANA CACTUS**—*Echinocereus enneacanthus*, referring to the banana shape of the many stems. (77)
- BARBED**—Having backward turned notches like fishhooks.
- BARREL CACTUS**—*Ferocactus wislizeni* F. leconte F. *acanthodes*, etc. (91)
- BISHOP'S CAP**—*Astrophytum asteria*.
- BISHOP'S HOOD**—*Astrophytum ornatum*. (83)
- BIZNAGA**—**VIZNAGA**—*Ferocactus wislizeni* and other cacti of this type. Bisnaga, Bisenegre and Bisabre are corruptions of the Spanish word Visnaga.
- BISNAGA DE CHILLILOS**—*Neomammillaria heyderi*, *applanata* and similar species. (82)
- BISNAGRE**—**BISAGRE**—See Bisnaga.
- BOXING GLOVE CACTUS**—*Opuntia mammillata*...
- BRACHYARTHRA**—Short jointed.
- BULBOUS**—Having or containing bulbs.
- CADUCOUS**—Falling off very early.
- CAESIUS**—Grey.
- CAESPITOSE**—At or just above the ground in tufts.
- CAMPANULATE**—Bell shaped or elongated cup shaped.
- CANDELABRUM CACTUS**—Name applied to *Opuntia imbricata*, *Opuntia arborescens* and similar species in reference to the candelabrum-like whorls of their branches. (25)
- CANDIDA**—White.
- CANE CACTUS**—*Opuntia kleiniae*.
- CARDENCHE**—Name applied to *Opuntia imbricata* in the vicinity of Durango and Zacatecas, Mexico.
- CENTIMETER**—One hundredth part of a meter or one inch equals 2½ centimeters.
- CEPHALIUM**—A special head for flowers.
- CHALYBEOUS**—Steel blue.
- CHAUTE OR CHAUTLE**—*Ariocarpus fissuratus* and A. *retusus*. (29)
- CHILITOS**—Fruit of a neomammillaria especially one bearing crimson chile-shaped fruits.
- CHOLLA**—Common name of the cylindric-stemmed, cane-like Opuntias, particularly *Opuntia fulgida*. (20)
- CHRISTMAS CACTUS**—*Zygocactus truncatus*.
- CHRYSACANTHUS**—With yellow spines.
- CILIATE**—Fringed with hairs at the margin.
- CLAVATE**—Club shaped.
- CLAVELLINA**—*Opuntia turnicatia* and other low prostrate forms.
- CLEISTOCACTUS**—Small flowered cactus.
- COACH WHIP CACTUS**—*Harrisia bonplandii*. (69)
- COB CACTUS**—*Echinocereus dasycanthus* and others with similar stem structure. (73)
- COCKS COMB CACTUS**—Any *Opuntia cristata*.
- COLA DEL DIABLO**—*Pereskiopsis velutina*.
- COLUMNAR**—Pillar like.
- COMPRESSED**—Flattened.
- CONFLUENT**—Blended into one by degrees.
- COROLLA**—The petals of a flower collectively.
- CORYPHANTHA**—Crested-tufted.
- COTYLEDONS**—Seed leaves of the embryo. (47)



*PERESKIA PERESKIA*

ML



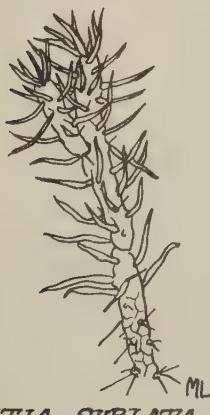
*PERESKIA* fruit and flower

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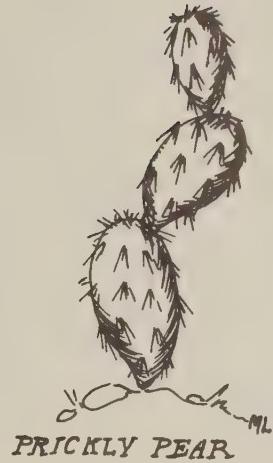
*PERESKIOPSIS*

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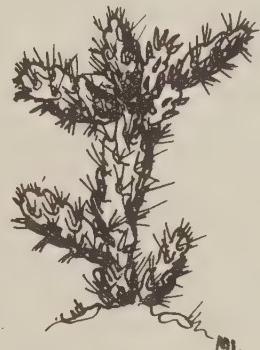


*OPUNTIA SUBLATA*

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*PRICKLY PEAR*



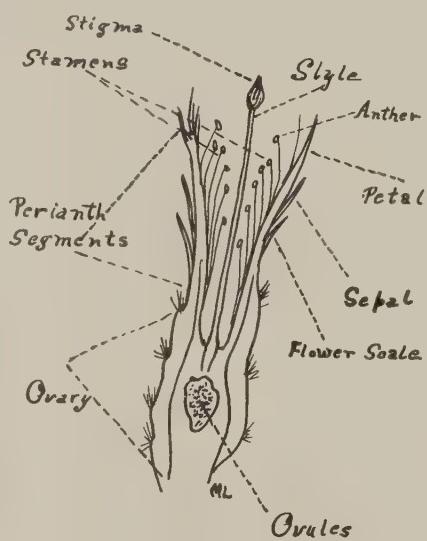
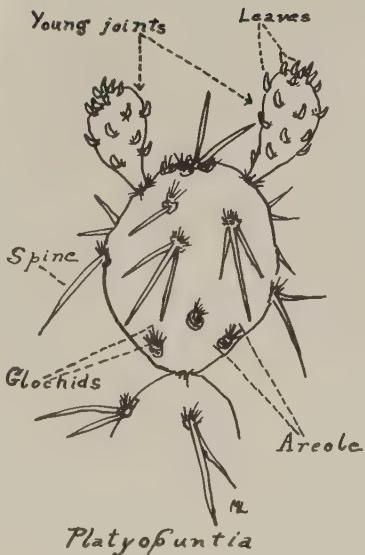
*CHOLLA*



*BARREL CACTUS*



*Periocereus  
Greggii*



OPUNTIA TYPE FLOWER



OPUNTIA TYPE SEED POD

**COW-TONGUE CACTUS**—*Opuntia linguiformis* in reference to the long tongue-like pads.  
**COYONOSTLII**—*Opuntia imbricata* and other similar species. Name applied to cholla cactus and all other cylindric, whip-like cacti.  
**COYOTE PRICKLY PEAR**—The common cholla cactus *Opuntia imbricata*.  
**CRAB CACTUS**—*Zygocactus truncatus*.  
**CRENATE**—Toothed or scalloped.  
**CUNEATE**—Wedge shaped.  
**CUSPIDATE**—Tipped with a sharp rigid point.  
**CYLINDRIC**—Having the form of a cylinder.  
**CYLINDROPUNTIA**—Any *Opuntia* with cylindric joints. (25)  
**DECIDUOUS**—Transitory.  
**DEFLEXED**—Bent or turning abruptly downward.  
**DEPRESSED**—Having a body shorter vertically than horizontally.  
**DETACHED**—Disconnected.  
**DEVIL'S HEAD**—*Homalocephala texensis* and similar species with strong thorns.  
**DEVIL'S PIN CUSHION**—Common name for *Echinocactus horizonthalonius* and other strong spined species. (42)  
**DEVIL'S ROPE**—Name used in Australia for *Opuntia imbricata*.  
**DIVERGENT**—Inclining away from each other.  
**DOLICOTHELE**—Long nippled.  
**DORSAL**—Relating to any part of the back.  
**DRY WHISKEY**—*Lophophora williamsii*.  
**DUMPLING CACTUS**—*Lophophora Williamsii*.  
**ECHINO**—Hedgehog.  
**ELLIPTIC**—In the form of an ellipse.  
**ELONGATED**—Lengthened.  
**EPIPHYtic**—Growing upon another plant but deriving no subsistence from it.  
**FERO**—Fierce.  
**FEROCACTUS**—A cactus with strong sharp spines.  
**FILAMENT**—The threadlike stem which bears the anthers.  
**FIMBRIATE**—Fringed.  
**FINGER CACTUS**—*Mammillaria* having teat-shaped tubercles as *Coryphantha sulcatus*.  
**FISHHOOK CACTUS**—*Ferocactus wislizenii* and species having a central hooked spine. (31)  
**FOLIACEOUS**—Leaf bearing or leaf like in appearance.  
**FRUIT**—The ripened ovary or berry.  
**GHOST CACTUS**—*Cephalocereus palmeri*.  
**GIANT CACTUS**—*Carnegiea gigantea*. (102)  
**GARAMBULLAS**—The word Garambullas is applied to nearly all currant-like fruits in Mexico.  
**GLABROUS**—Having a surface without projections.  
**GLANDULAR**—Having the nature of glands.  
**GLAUCAous**—Grayish or greenish-blue.  
**GLOBOSE**—Globe shaped.  
**GLOBULAR**—Globose or nearly so.  
**GLOCHIDS**—Spines with barbed tips.  
**GRIZZLY BEAR**—*Opuntia ursina*.  
**HEDGEHOG CACTUS**—As Echino means hedgehog any species of *Echinocereus*, *Echinocactus*, *Echinomastus*, *Echinopsis*, or *Echinofossulocactus*, etc. (74)  
**HELIO**—Pertaining to sun.  
**HEMISPHERIC**—Half a sphere or shaped like half a ball.  
**HIKILI**—Indian name for *Lophophora williamsii*.  
**HILUM**—The mark at the point of attachment of an ovary to the plant.  
**HUMILIS**—Small, low.  
**HYLO**—Climbing forest plants.  
**HYPOCOTYL**—Region of the stem below the cotyledons.  
**IMBRICATE**—Overlapping like shingles on a roof.  
**INDIAN FIG**—Common name for prickly pear, especially the species that are cultivated for their fruits. (75)  
**INSULARIS**—An island plant.  
**JASMINOCEREUS**—A *cereus* having jasmine like flowers.  
**JOINT**—Section of the stem or branch of an *Opuntia*.  
**JOCONOSTLE**—A species of *Opuntia* grown in Mexico. The tunas are eaten only when cooked.  
**JUMPING CACTUS**—*Opuntia fulgida* and any other cylindropuntia. (20)  
**KAMAMA**—Indian name for *Lophophora williamsii*.  
**LACE CACTUS**—*Echinocereus reichenbachii* in reference to the lace-like appearance of the spines.  
**LAMPROSPERMUS**—Shiny-seeded.



Depressed



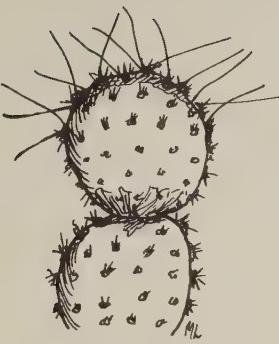
Sublate



Elongated



Oblong



Orbicular



Obovate



Reniform



Elliptical

**LANCEOLATE**—Shaped like a lance or tapering to the apex.  
**LANIFEROUS**—Wooly.  
**LATERAL**—Pertaining to side.  
**LEAD PENCIL CACTUS**—*Wilcoxia posegneri*.  
**LENCHA DE VACA**—*Opuntia linguiformis* in reference to the elongated pads.  
**LEPIDOTUS**—Scaly.  
**LIMAS DE VIZNAGA**—Fruit of *Echinocereus longihamatus*.  
**LINEAR**—Narrow, much longer than wide, with edges parallel.  
**LIVING ROCK**—*Ariocarpus fissuratus*. (29)  
**LONGISPINA**—Long spined.  
**LOPHOCEREUS**—Tufted haired cereus.  
**LUNATE**—Half moon or crescent shaped.  
**MACROCEPHALUS**—Large headed.  
**MAMMILLARIA**—Mammal like.  
**MANCO CABALLO**—*Homalocephala texensis*, commonly called Devil's head.  
**MARITIMA**—On or near sea coast.  
**MELCOCHA**—Tuna honey syrup.  
**MELON CACTUS**—*Echinocactus horizonthalonius* and others of the shape described by the term "melon." (42)  
**MERRY WIDOW CACTUS**—*Echinocereus reichenbachii* in reference to the flower which resembles one of the large spreading hats at one time popular in the United States.

**MESCAL BUTTON**—*Lophophora williamsii*.  
**MICRO**—Small.  
**MICROCARPA**—Small fruited.  
**MICROSPERMA**—Small seeded.  
**MIEL DE TUNA OR TUNA HONEY**—A thick syrup made by boiling seeded tunas.  
**MILLIMETER**—One-tenth of a centimeter.  
**MISSION PEAR**—All edible tunas.  
**MONKEY TAIL CACTUS**—*Bergerocactus emori*.  
**MONSTROSE**—Unusual; abnormal.  
**MUCILAGINOUS**—Of the consistency of mucilage.  
**MUCRONATE**—Tipped with an abrupt point.  
**MYRTILLOCACTUS**—Myrtle flowered cactus.  
**NEO**—New.  
**NIGHT BLOOMING CEREUS**—*Peniocereus greggii*. *Nyctocereus serpentinus*.  
**NIGGERHEAD**—*Echinocactus horizonthalonius* and any *Echinocactus*. (42)  
**NIGRISPINA**—Black spined.  
**NIPPLE CACTUS**—All Mammillarias having nipple or teat-shaped tubercles.  
**NOCTURNAL**—Night flowering.  
**NOPAL**—Mexican name applied to all flat-jointed species of *Opuntia*. (66)  
**NOPAL CEGADOR**—*Opuntia microdasys*. Nopal cegador is applied to a kinds of *Opuntia* that bear glochids instead of spines. The tiny spines or glochids are said to blind cattle, horses, etc.  
**NOPALITOS**—The young and tender pads of prickly pear, which are cooked like string beans by the Mexicans.  
**NYCTO**—Night.  
**NYCTOCEREUS**—Night blooming cereus. (45)  
**OBLIQUE**—Of Unequal sides. Slanting.  
**OBOVATE**—Ovate with the broader end at the apex.  
**OBTUSE**—Blunt or rounded at the end.  
**OCHOTERENA**—*Opuntia rufida*.  
**OLD MAN CACTUS**—*Cephalocereus senilis*. (115)  
**OLD WOMAN CACTUS**—*Neomammillaria hahniana*.  
**OREOCEREUS**—Mountain cereus.  
**ORGANO**—*Pachycereus marginatus*.  
**ORGANPIPE CACTUS**—*Lemaireocereus thurberi*.  
**OVOID**—Egg-shaped.  
**OVARY**—That part of the flower in which the seeds form.  
**OVATE**—Shaped like the longitudinal section of a hens egg. The base section being the widest.  
**PANCAKE CACTUS**—Any *Platycopuntia*.  
**PAOILLOSE**—Bearing or resembling papillae.  
**PAPILLAE**—Small nipple shaped projections.  
**PEANUT CACTUS**—*Chamaecereus silvestrii*.  
**PEAR**—Any *Opuntia*. An abbreviation for prickly pear.  
**PECTINATE**—Cleft with narrow and closely set segments as a comb.  
**PENCAS**—Mexican name for prickly pear cattle feed.  
**PENIOCEREUS GREGGII**—Gregg's thread cereus.  
**PEPPERITAS**—Small pear shaped fruit of Neomammillarias.  
**PERIANTH**—The floral envelopes or leaves of the flower.



Acuminate



Campanulate



Crenate



Apiculate



Clavate



Spatulate



Hemispheric



Lanceolate

**PEST PEAR**—Name given to an *Opuntia* in Australia.  
**PETAYA**—Fruit from a species of *Cereus* and *Echinocereus*, particularly *Echinocereus stramineus*. (28)  
**PEYOTE**—*Lophophora williamsii*.  
**PEYOTE CIMMARONS**—*Ariocarpus fissuratus*, misnomer. (29)  
**PHATNOSPERNA**—Pitted seeds.  
**PHYMATOTHELE**—Swollen tubercles.  
**PICHILINGA**—The common name of *Neomammillaria heyderi*. (82)  
**PINCUSHION CACTUS**—Any cactus with spines.  
**PIOTE BEAN**—See Peyote.  
**PITAHAYA OR PITAJAYA**—Name given any fruit of a *Cereus* throughout Mexico.  
**PITAHAYITA**—*Wilcoxia striata* seed-pods.  
**POLLEN**—Yellow powder contained in an anther theca.  
**PORRECT**—Extended or pointed away from.  
**PRICKLEY PEAR**—Name applied to any *Platyopuntia*.  
**PROCUMBENT**—Lying along the ground.  
**PROLIFEROUS**—Reproducing freely by offsets.  
**PROSTRATE**—Lying quite flat on the ground.  
**PRUINOSE**—Covered with a hoary powder or color.  
**PSEUDO**—False.  
**PULESCENT**—Clo. h.d with short, soft, downy, hairs, or spines.  
**PUBESCENTES**—A division of cacti usually rich with bristles or hairy spines.  
**PUNCTATE**—Dotted with minute depressions.  
**PUNGENT**—Terminating in a rigid sharp point.  
**PYRIFORM**—Pear shaped.  
**RADICAL**—Pertaining to the root.  
**RAINBOW CACTUS**—Arizona; *E. rigidissimus*; New Mexico, *E. chloranthus*; Texas *E. dasycanthus*.  
**RECURVED**—Curved backward or downward.  
**REPANDUS**—Undulating.  
**ROOT CACTUS**—*P. greggii*.  
**REFLEXED**—Abruptly bent or curved downward or backward.  
**RETUSE**—Around apex with a shallow notch.  
**RUGOSE**—Showing wrinkles caused by sunken veinlets.  
**SACASIL**—*Wilcoxia poselgeri*.  
**SALFERFORM**—Saucer shaped.  
**SCABROUS**—Rough to the touch.  
**SCOPIFORM**—Formed like a brush.  
**SERRATE**—Beset with antrorse teeth.  
**SERRULATE**—Serrate with very fine teeth.  
**SESSILE**—Attached directly by the base.  
**SETIFEROUS**—Bristly.  
**SHEATH**—The covering of the spines of certain cacti.  
**SLENDER STEM CACTUS**—*Opuntia leptocaulis*.  
**SOLITARY**—Single.  
**SPATULATE**—Oblong shaped like a druggists spatula.  
**SPINE**—Any needle-like growth without vascular tissue.  
**SPINELET**—A very small spine.  
**SPINIFEROUS**—Bearing spines.  
**SPINULIFEROUS**—Bearing minute spines.  
**SUAMIFEROUS**—Covered with scales.  
**STAMEN**—Combined filament and anther.  
**STENOGONUS**—Narrow angled.  
**STIGMA**—That part of the pistil which receives the pollen for the fecundation of the ovules or female part of flower.  
**STRAWBERRY CACTUS**—*Echinocereus enneacanthus*, *E. rosei*, etc.  
**STYLE**—The tube between the stigma and the ovary.  
**SUBULATE**—Awl shaped.  
**TASAJO**—*Opuntia leptocaulis*.  
**TASAJO**—*Opuntia imbricata* also *Hylocereus undatus* in Durango, Mexico.  
**TEAT CACTUS**—Any *Mammillaria*, *Neomammillaria* or *Corphantha*.  
**TEREDE**—Cylindrical and tapering with circular cross section.  
**TERMINAL**—Growing at the end.  
**TETRAGONUS**—Four angled.  
**THELOCACTUS**—Nipple cactus.  
**THORN**—Any needle like growth with vascular tissue. A name often erroneously given to a spine.  
**TOmentose**—Densely pubescent with a matted wool.  
**TREE CACTUS**—*Opuntia arborescens* which means tree-like. (25)  
**TRIANGLE CACTUS**—*Hylocereus undatus*.  
**TRICHOCEREUS**—Hairy flowered cereus.  
**TRUNCATE**—Having the end square or even as if cut off.  
**TUBERCLE**—A nipple.

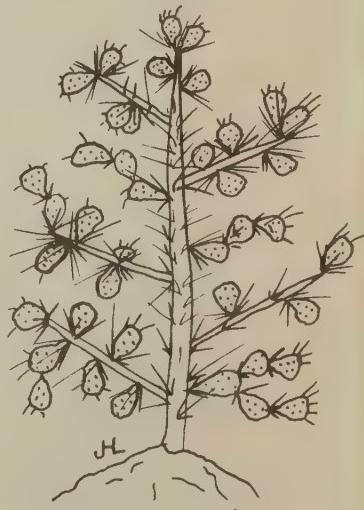
**TUBERCULATE**—Covered with knobby projections or tubercles.  
**TUBEROUS**—Shaped like a tuber.  
**TUNA**—Large edible fruit or seed-pods of the prickly pear.  
**TUNA HUELL**—*Opuntia imbricata* (Griffiths.)  
**TUNA MIEL**—Or tuna honey.  
**TUNAS PASADAS**—Dried tuna fruits, sometimes pressed into cakes.  
**TUNA-QUESO**—Cakes made from tunas. Queso means cheese.  
**TUNAS SECAS**—Dried tunas for winter use.  
**TUNAE**—All cacti which bear tunas.  
**TURBinate**—Shaped like a top.  
**TURGID**—Swollen beyond natural size.  
**TURK'S HEAD**—*Cactus intortus*.  
**TWISTED RIB CACTUS**—*Hamatocactus setispinus*.  
**UMBILICUS**—The hilum of a seed.  
**UNDULATE**—Wavy.  
**VELAS DE COYOTE**—The coyote's candle. *Opuntia imbricata*.  
**VENTRAL**—Belonging to the side opposite the dorsal.  
**VISNAGA**—See Bisnaga.  
**VIZNAGA**—Any barrel shaped large growing cactus.  
**VIZNAGITA**—Any small globular cactus.  
**WOKOWI**—*Lophoprora williamsii*.  
**XANTHOCARPUS**—Having a yellow fruit.  
**XOCONOCHTLI**—*Opuntia imbricata*.



Truncate



Ovate



Opuntia  
Braziliensis.

83 Cactus Acre, El Paso, Tex.

This is a fair price for the following:

## Larger Plants in Proportion

<i>Ancistrocactus</i>	<i>Braehamatus</i>	25c
"	<i>sheeri</i>	25c
<i>Aporocactus</i>	<i>taeniiformis</i>	25c
<i>Ariocarpus fissuratus</i>	<i>kotschoubeyanus</i>	\$1.00
"	<i>retusus</i>	\$1.00
<i>Astrophytum asterias</i>	<i>capricorne</i>	\$1.00
"	<i>myriostigma</i>	\$1.00
"	<i>ornatum</i>	\$1.00
<i>Bergerocactus emoryi</i>		50c
<i>Carnegiea gigantea</i>	<i>chrysacanthus</i>	\$1.00
<i>Chephalocereus</i>	<i>macrocephalus</i>	\$5.00
"	<i>palmeri</i>	\$1.00
<i>Chamaceerus</i>	<i>semis</i>	25c
<i>Chamaceerus silvestrii</i>		25c
<i>Cleistocactus baumannii</i>		50c
<i>Coryphantha aggregata</i>		25c
"	<i>macromeris</i>	25c
"	<i>muehlenpfordtii</i>	\$1.00
"	<i>neomexicana</i>	25c
"	<i>nicholliae</i>	\$1.00
"	<i>recurvata</i>	\$1.00
"	<i>robustispina</i>	
"	<i>ruryonii</i>	25c
"	<i>sulcata</i>	50c
<i>Dolichothele</i>	<i>sphaerica</i>	25c
"	<i>longimamma</i>	\$1.00
<i>Echinocactus</i>	<i>acanthodes</i>	25c
"	<i>emory</i>	\$1.00
"	<i>horizonii</i>	50c
"	<i>horizonii-halonius</i>	25c
"	<i>ingens</i>	\$3.00
"	<i>windescens</i>	25c
<i>Echinomastus</i>	<i>dasyacanthus</i>	25c
"	<i>intertextus</i>	25c
"	<i>maddowellii</i>	25c
<i>Echinopsis</i>	<i>multiplex</i>	25c
"	<i>meuleri</i>	25c
"	<i>tubiflora</i>	25c
"	<i>hybrids</i>	25c
<i>Epiphyllum</i>		25c
<i>Epithelantha</i>	<i>micromeris</i>	25c

### Larger Plants in Proportion

<i>Echinocactus</i>	<i>dasyacanthus</i>	25c	<i>Nyctocereus</i>	<i>serpentinus</i>
	<i>tuberculosa</i>	25c	<i>Opuntia</i>	<i>arborescens</i>
<i>Echinocactus</i>	<i>blanckei</i>	25c		<i>arbuscula</i>
"	<i>caespitosus</i>	25c		"
"	<i>chloranthus</i>	25c		<i>brasiliensis</i>
"	<i>clavigeratus</i>	50c		<i>bigelovii</i>
"	<i>ctenoides</i>	\$1.00		<i>cylindrica</i>
"	<i>dasyacanthus</i>	25c		<i>emoryi</i>
"	<i>dubius</i>	25c		<i>fulgida</i>
"	<i>engelmannii</i>	25c		<i>grahamii</i>
"	<i>enneacanthus</i>	25c		<i>imbricaria</i>
"	<i>fendleri</i>	25c		<i>kleiniae</i>
"	<i>grandis</i>	\$1.00		<i>leptocaulis</i>
"	<i>Knippelianus</i>	50c		<i>lindheimeri</i>
"	<i>longiserius</i>	50c		<i>macrocalyx</i>
"	<i>mohavensis</i>	25c		<i>macrocentra</i>
"	<i>pentadouphus</i>	25c		<i>microdasys</i>
"	<i>reichenbachii</i>	25c		<i>monacantha</i> var.
"	<i>rigidissimus</i>	25c		<i>oblongata</i>
"	<i>roettleri</i>	\$1.00		<i>pottsi</i>
"	<i>rosei</i>	25c		<i>ramosissima</i>
"	<i>stramineus</i>	25c		<i>rufida</i>
<i>Ferocactus</i>	<i>acanthodes</i>	25c		<i>schoitii</i>
	<i>covillei</i>	\$1.00		<i>stanleyi</i>
"	<i>lecontei</i>	\$1.00		<i>sublata</i>
"	<i>uncinatus</i>	25c		<i>tenuispina</i>
"	<i>wislizenii</i>	25c		<i>thurberi</i>
<i>Hammatacactus</i>	<i>seispinus</i>	50c		"
	<i>Harrisia</i>	50c		<i>ursina</i>
"	<i>bonplandii</i>	50c		
"	<i>tortuosa</i>	50c		
<i>Homalocephala</i>	<i>williamsii</i>	25c	<i>Pachycereus</i>	<i>marginatus</i>
<i>Hylocereus</i>	<i>texensis</i>	25c	<i>Peniocereus</i>	<i>greggii</i>
<i>Hylocereus</i>	<i>undatus</i>	25c	<i>Selenicereus</i>	<i>beccmannii</i>
<i>Lemairiocereus</i>	<i>pruinosus</i>	\$1.00		<i>macdonaldiae</i>
"	<i>thurberi</i>	\$3.00		<i>lophophorella</i>
<i>Lophophoria</i>	<i>williamsii</i>	25c		<i>ossulatus</i>
<i>Machaerocereus</i>	<i>erucu</i>	\$5.00		<i>pottsii</i>
<i>Neomammillaria</i>	<i>boscosa</i>	25c	<i>Thelocactus</i>	<i>bicolor</i>
"	<i>compressa</i>	50c		<i>leucacanthus</i>
"	<i>denniana</i>	25c		"
"	<i>goodridgei</i>	25c		<i>spinulosus</i>
"	<i>hemisphaerica</i>	25c		
"	<i>heyderi</i>	25c		
"	<i>lastiacantha</i>	25c		
"	<i>melacantha</i>	25c		
"	<i>microcarpa</i>	25c		
				<i>Zygocactus</i> <i>truncatus</i>

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U. S. Department of Agriculture

# PLANTING DIRECTIONS:

CLARA LEASURE

EL PASO, TEXAS

Cacti should be planted in a sandy soil, river-bottom sand is best with a little lime or broken mortar in it, if planted in pots, a small amount of gravel or broken pots should be placed in the bottom for drainage, plant the roots as deep as possible but do not plant the cactus below the dirt line as to do so will rot the plant. Prune the roots before planting, water after planting and then twice a month by placing the pot in a pan of water for twenty minutes, this allows the roots to suck up as much water as the plant needs. Then place the pot in the sun, and remember most cacti are hot country plants, so treat accordingly. Loose gravel adds to the beauty of the plants when placed on top of the soil around the plant and will give it a near natural surrounding.

A cactus garden should be built about 1 Ft. higher than the surrounding ground. A wall of stones without mortar is ideal. Mound your soil and place large rocks here and there to hold the soil in place and then plant your cacti the taller ones in the center and the smaller ones at the outer edge. If you have cacti which freeze in your climate, plant them in pots and sink the pots to the level of the soil and in the winter the plants can be taken to a cellar for safe keeping and your garden in no way disturbed.

Cuttings can be rooted readily by drying them in the sun for two weeks, to heal the cut, then plant them in dry sand for a few days before giving them any water. If your cactus get root-rot, cut off the rotted part and place in the sun till the cut is well hardened and plant in dry sand as the cuttings and many a fine plant can be saved. Lime rubbed over the cut will hasten this process. Hot-vegetable tongs will do very well in handling when planting cacti.

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## *How to grow Cacti from Seed*

To Plant Cactus seeds, take a large flower pot and place a hand full of broken pottery or rocks in the bottom and fill 3-4 with a damp sand; sprinkle seeds evenly and then press them in with a smooth block, covering these with a thin layer of dry sand. Place a pane of glass over the top, allowing a small space for air. Water daily by placing pot in saucer of water till sand is wet.

Sand must be kept damp at all times until seeds germinate.

# parade



SET FOR SHOWERS

See Page 4

Sunday  
Picture Magazine

The El Paso Times

REG. U. S. PAT. OFF.  
April 18, 1948



Cactus expert John H. Leasure checks one of the thousands of cacti he raises at "Cactus Acres" near El Paso.

## The Master of Cactus Acres

**John Leasure became interested in cacti as a wounded veteran. Now it's a big business**

NEITHER THE KINDLY nurse nor the extremely sick soldier knew that the small cactus plant she gave him someday would blossom into an interesting and profitable business. But that's exactly what happened.

Just 25 years ago John H. Leasure, who had been severely gassed in France, was bed-ridden in an El Paso, Tex., army hospital, the ninth one he'd been in during five years. He had little interest in anything.

The nurse, trying to direct the sick man's thoughts away from his illness, gave him the spiny plant. Leasure kept it at his bedside and his wife, Clara, and friends added

others. As time went on Leasure became interested in the different varieties of cactus, and when he was discharged Clara took the collection home.

John Leasure was unable to work. Clara described it this way recently: "We were stony broke, so I put some of the best cactus in bowls, painted a small sign, and placed them outside. A tourist stopped and bought one. The next day I sold some more. We haven't been hungry since."

So began a business in cactus. Today, John Leasure is an international authority on the plants, has published a small book on cactus containing a dictionary of cactus terminology. At his farm near El Paso he has a 1,600-square-foot greenhouse in which he raises 1,038 varieties from tiny seedlings to giant 20-foot plants.

The business is generally in small orders but it is worldwide. "And it all started with one plant," he confides.



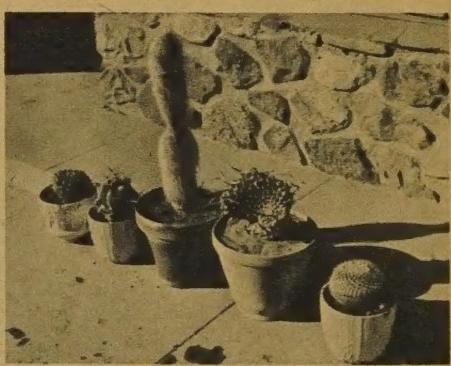
Leasure (right) supervises helpers digging and trucking Spanish Dagger type of cactus.



Lampstands and tables Leasure fashions from the tough wood of "Jumping Cholla" variety.



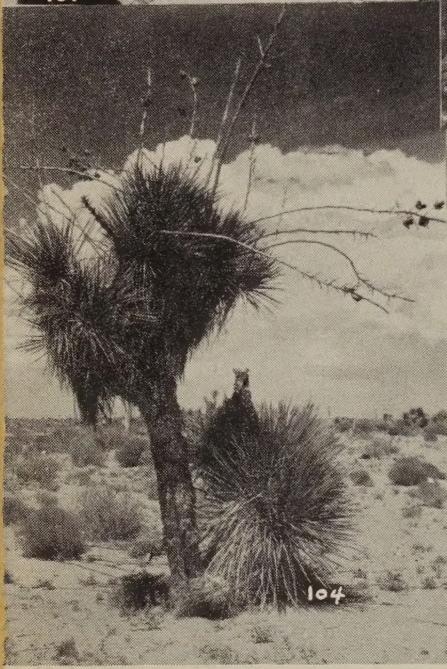
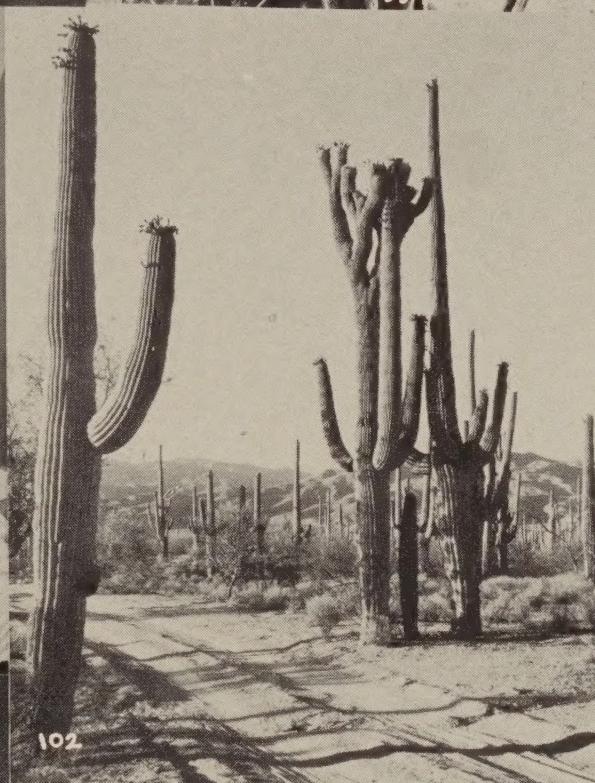
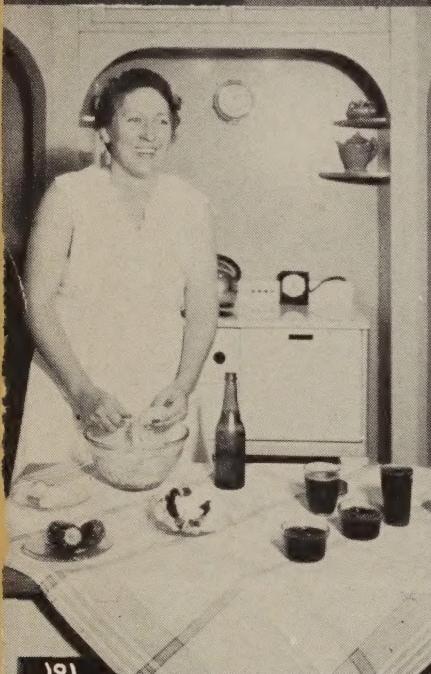
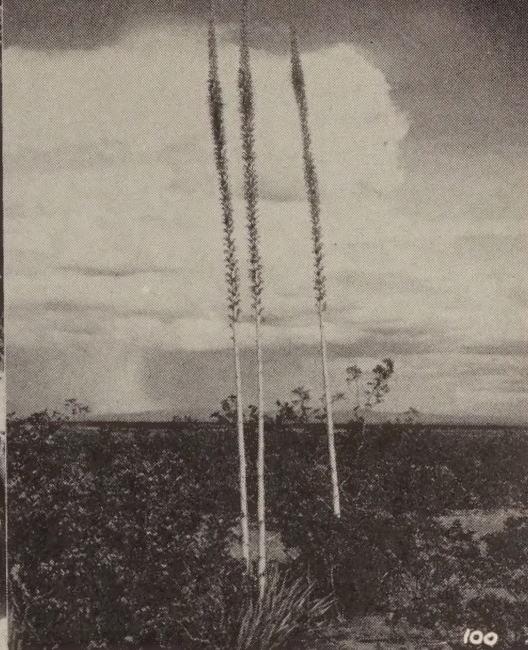
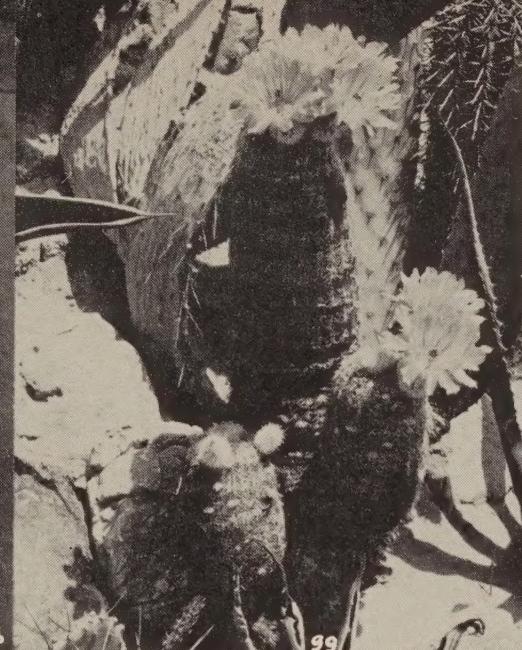
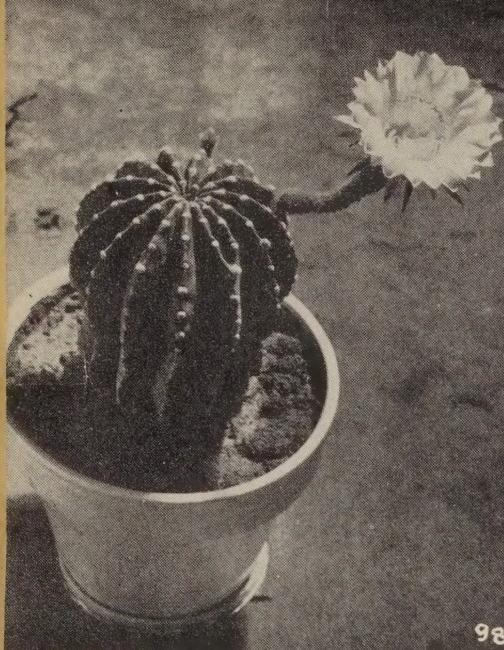
Tourists Mrs. Fred Black and daughters bought plants for their home in Akron, Mich.



Cactus Acres' rare types are called Living Rock, Barrel, Grandpa, Coxcomb, Bird's Nest.



Clara Leasure and her husband get cactus orders from all parts of the world. THE END.



J. Edgar Hoover, (quote) The cacti arrived this morning. I have already had the rainbows planted in a bowl.

What amazed me was to see how the blossoms had carried all that distance. Although they would appear to be rather fragile they arrived without a bruise, and since being taken from the package several of the buds have burst into bloom.

